TERNATIONAL JOINT COMMISSION (UNITED STATES AND CANADA) 1909-

HEARINGS AND ARGUMENTS IN THE MATTER OF THE APPLICATION OF THE GREATER WINNIPEG WATER DISTRICT FOR APPROVAL OF THE DIVERSION OF THE WATERS OF THE LAKE OF THE WOODS AND SHOAL LAKE FOR SANITARY AND DOMESTIC PURPOSES

1914

HEARINGS AND ARGUMENTS

IN THE MATTER OF

THE APPLICATION OF THE GREATER WINNIPEG WATER DISTRICT

FOR

APPROVAL OF THE DIVERSION OF THE WATERS OF THE LAKE OF THE WOODS AND SHOAL LAKE FOR SANITARY AND DOMESTIC PURPOSES

FILED SEPTEMBER 8, 1913

DECIDED JANUARY 14, 1914

WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

INTERNATIONAL JOINT COMMISSION.

UNITED STATES.	CANADA.
JAMES A. TAWNEY, *Chairman.*	TH. CHASE CASGRAIN, K. C., *Chairman.*
GEORGE TURNER.	HENRY A. POWELL, K. C.
OBADIAH GARDNER.	CHARLES A. MAGRATH.
WHITEHEAD KLUTTZ, *Secretary.*	LAWRENCE J. BURPEE, *Secretary.*

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LETTER OF TRANSMITTAL.

DEPARTMENT OF PUBLIC WORKS,
DOMINION OF CANADA.

I hereby approve of the annexed application by the Greater Winnipeg Water District and of the map referred to therein (the scale of said map being in my opinion sufficient).

Duplicates of said application and of said map are hereby transmitted to the International Joint Commission under the treaty between the United States and Great Britain, signed January 11, 1909, and I hereby request the commission to take appropriate action thereon.

Dated at Winnipeg this 25th day of August, A. D. 1913.

R. ROGERS,
Minister of Public Works.

APPLICATION OF GREATER WINNIPEG WATER DISTRICT FOR APPROVAL OF DIVERSION OF WATERS OF LAKE OF THE WOODS AND SHOAL LAKE.

To the Hon. ROBERT ROGERS,
Minister of Public Works for the Dominion of Canada:

The petition of the Greater Winnipeg Water District humbly showeth as follows:

1. Your petitioners are a corporation duly created by an act of the legislative assembly of the Province of Manitoba, being chapter 22 of the statutes of said Province passed in 3 George V (1913), and brought into force by proclamation of the lieutenant governor in council on the 10th day of June, 1913, issued upon and after the vote mentioned in sections 86 to 89 of said act had been duly taken and was answered affirmatively by six-sevenths of the electors voting thereon;

2. Your petitioners are desirous of obtaining the approval of the Government of Canada for the use of the waters of Shoal Lake (situate in the Provinces of Ontario and Manitoba) and Lake of the Woods for domestic and sanitary purposes by the inhabitants of the Greater Winnipeg Water District and for such purposes the right, privilege, and power of constructing a system of waterworks with the pipe line or intake pipe placed in said Shoal Lake at or about latitude 49° 38′ N., longitude 95° 7′ 50″ W., in the Province of Ontario, and from there carried and connected by a pipe line through parts of the Provinces of Ontario and Manitoba to a point or points in the Greater Winnipeg Water District; and for said purposes to exercise the powers conferred by an act of the Parliament of Canada to enable the city of Winnipeg to get water outside the Province of Manitoba, which said act was passed in the session of 1912–13;

3. The use of said water for the purposes aforesaid is rendered imperative in the opinion of your petitioners after careful examination by competent experts and authorities, owing to the rapidly increasing population of the said Greater Winnipeg Water District and the insecurity of the present artesian source of supply, and the difficulties and danger attending the use of the water of either of the rivers flowing through the district (Red and Assiniboine Rivers);

4. Your petitioners submit that the use and diversion of said water from Shoal Lake and Lake of the Woods for said purposes will not appreciably affect the level of the Lake of the Woods, or in any way affect the right or ability to navigate said lake and will not injuriously affect the interests or rights of any parties;

5. Your petitioners beg to point out that the present population of the Greater Winnipeg Water District is estimated at 225,000 souls and that the population for the same territory at the census of 1901 was only 50,000;

6: Herewith are filed the following: Two tracings or maps showing the position of Shoal Lake and indicating generally the route of the proposed pipe line from the said lake to the city of Winnipeg;

APPLICATION TO INTERNATIONAL JOINT COMMISSION.

7. In view of clause 10 of the said act of the Parliament of Canada and the connection of said Shoal Lake with the Lake of the Woods, which latter lake is a boundary water under the terms of the waterways treaty between Great Britain and the United States of America of January 11, 1909, respecting boundary waters, your petitioners are desirous that the International Joint Commission under said treaty should confirm your petitioners' right to take the water of Shoal Lake and Lake of the Woods for the purposes aforesaid, and do hereby request that you will transmit this application to the said commission under rules 6, 7, and 8 of said commission accompanied with a request that the commission take appropriate action thereon. For such purpose your petitioners forward herewith the following documents (in addition to those hereinbefore mentioned and in addition to the two originals of this paper intended for the approval of your department):

(*a*) One duplicate original of this application for each of the secretaries of said commission.

(*b*) One original tracing map (for each of said secretaries), showing the territory in question and indicating the general direction of the proposed pipe line (this is duplicate of the map herewith filed with your department).

(*c*) Twenty-five printed copies of this application for each secretary (50 in all).

(*d*) Twenty-five white prints of said map for each secretary (50 in all).

8. Your petitioners request that in transmitting this application and the accompanying papers to the Canadian and American secretaries of the commission at Ottawa and Washington, respectively, that your department forward therewith your approval thereof under the terms of rule No. 8 of said commision.

Your petitioners therefore pray:

(1) That you will approve of said map under the provisions of section 3 of said act of the Parliament of Canada, and

(2) That you will transmit this application to the Canadian and American secretaries of the International Joint Commission in compliance with its rules together with your expressed approval thereof and with your request that the commission take appropriate action thereon.

And your petitioners will ever pray.

THOS. R. DEACON,
Mayor of Winnipeg and President of the Administration Board of the Greater Winnipeg Water District.

[SEAL.]

M. PETERSON,
Secretary of said Board.

DEPARTMENT OF STATE,
Washington, November 7, 1913.

The INTERNATIONAL JOINT COMMISSION
OF THE UNITED STATES AND CANADA,
Washington, D. C.

SIRS: Referring to the letter of the American secretary of the International Joint Commission between the United States and Canada, dated September 11, 1913, transmitting copies of the application of the Greater Winnipeg Water District to the International Joint Commission for approval of a diversion of water from Shoal Lake, Ontario, for domestic and sanitary purposes, you are advised that the application was duly transmitted to the War Department for its consideration and that this department is in receipt of a communciation from the War Department stating that it sees no objection to the diversion proposed in the application. In view of this statement of the War Department, this department does not desire to file with the commission, under its rule of procedure No. 10, any statement in response to the said application of the Greater Winnipeg Water District.

For the Secretary of State.

I am, sirs, your obedient servant,

J. B. MOORE, *Counselor.*

SHOAL LAKE DIVERSION—HEARINGS AND ARGUMENTS.

WASHINGTON, D. C., *January 13, 1914.*

The International Joint Commission met at 10 o'clock a. m., in its offices in the Southern Building, Washington, D. C.

Present: James A. Tawney (presiding); Th. Chase Casgrain, K. C.; George Turner; Henry Powell, K. C.; Obadiah Gardner; and Charles A. Magrath. L. White Busbey and Lawrence J. Burpee, secretaries.

There were present:

Isaac Campbell, Esq., representing the Greater Winnipeg Water District.

Mr. James H. Fuertes, consulting engineer for the Greater Winnipeg Water District.

A. McLennan, representing the town of Kenora, Ontario, and the Kenora Board of Trade.

C. F. MacInnes, representing the Dominion Government.

Mr. George W. Koonce, representing the legal department of the War Department of the United States.

Mr. Adolph F. Meyer, consulting engineer.

Mr. Arthur V. White, consulting engineer.

The CHAIRMAN. Before we proceed, Judge Campbell, it might be well to make a brief statement in regard to procedure before this commission.

There seems to be some misunderstanding in the minds of some people regarding the functions of the commission, as well as its jurisdiction. It has been the theory of the commission that, having been given official jurisdiction, it exercises judicial functions, and in preparing the rules of procedure we have endeavored to follow the procedure of the courts, as nearly as possible, on both sides of the line, with such latitude as was necessary to meet the convenience of parties having business before the commission. In the case which is now before us I would suggest to those who represent interests on both sides that we should proceed as nearly as possible in accordance with the established rules of practice in judicial tribunals, both in the United States and in Canada; that is, the applicant shall proceed to make out his case, and then those who are opposed will be given an opportunity to be heard, while the opponents will, of course, be given the right to cross-examine, just the same as under the procedure of the courts in both countries. I make this statement in the interest of orderly procedure in the hearing of the case and to avoid any confusion or conflict that might arise in the absence of such orderly procedure.

Judge Campbell, as you represent the applicant, you may proceed now to present whatever evidence you have in favor of the order which you ask of this commission. I would suggest that if you have witnesses they take a position at the end of the table, so that they can face the commission, as well as counsel, during the examination.

Mr. CAMPBELL. You have the printed copies of the application?

The CHAIRMAN. Yes.

STATEMENT OF ISAAC CAMPBELL, ESQ., REPRESENTING THE GREATER WINNIPEG WATER DISTRICT.

Mr. CAMPBELL. I may say, Mr. Chairman and members of the commission, that at the time this application was filed we ourselves had a slight doubt about whether the minister of public works on our side of the boundary line could forward an application of this kind to you. In the opinion drawn in October, I believe, by Senator Turner, the clause of our navigable waters act is quoted. That is the one that caused me to doubt. But, on account of our minister of public works being in the West all summer, we could not get an order in council conveniently at Ottawa, and we had our application filed for it, and one has been recently issued, which I will file. I believe the secretaries have it.

Mr. MACINNES. I have it.

Mr. CAMPBELL. I think I would like to have Mr. MacInnes explain one clause of it, that covering the question of your jurisdiction. Mr. MacInnes has acted for the Dominion Government on the point of Shoal Lake being a boundary water, and perhaps he can make the explanation initially without my referring more to it.

Mr. MACINNES. I do not want to depart from the procedure outlined by you, Mr. Chairman. But the application, as you are aware, is submitted by the applicant to the particular government. It was sent forward simply as an application. Since that time this order in council has been passed dealing with the subject and dealing with the map which is attached to the application.

(The paper referred to was read by Mr. MacInnes, as follows:)

AT THE GOVERNMENT HOUSE AT OTTAWA,
Saturday, January 3, 1914.

Present: His Royal Highness the Governor General in council.

Whereas an application was recently made by the Greater Winnipeg Water District (a corporation created by a special act of the Legislature of Manitoba and on which certain powers were conferred by a special act of the Parliament of Canada passed in 1913, ch. 206 of 3-4 George V) to the minister of public works asking for the approval, under section 3 of the said act of Parliament, of a certain map or plan in relation to the use of the waters of Shoal Lake situated in the Provinces of Ontario and Manitoba for domestic and sanitary purposes by the inhabitants of the Greater Winnipeg Water District, and requesting that the said application be transmitted to the International Joint Commission with the approval of the minister of public works and with the request that the said commission take appropriate action thereon;

And whereas the said application was transmitted by the minister of public works to the International Joint Commission with his approval and with the request that appropriate action be taken thereon;

And whereas it appears that under a ruling subsequently made by the International Joint Commission the existing rules of procedure of the said commission require that approval of such a map or plan as is attached to the said application should first be given by the governor in council before consideration thereof by the said commission;

And whereas after full consideration the conclusion has been reached that Shoal Lake is not a boundary water within the definition thereof in the treaty between Great Britain and the United States relative to boundary waters, dated 11th January, 1909, or otherwise, but it has further appeared, however, that the said application is in such terms that the diversion of water contemplated thereby may be such as to affect the natural level or flow of boundary waters and the interests of navigation of both Canada and the United States;

And whereas it has also appeared that the said Shoal Lake is within the scope of an outstanding reference to the International Joint Commission under Article IX of the said treaty, relating to "the waters of the Lake of the Woods and the waters flowing into and from the said lake:

The secretary of state for external affairs, with the approval of the minister of public works, reports that Shoal Lake is not to be considered a boundary water, but that the

interests of navigation and the level of boundary waters on both sides of the boundary may possibly be affected, and that the said application covers matters connected with the investigation directed by the said reference to the said commission under Article IX of the said treaty. It thus appears desirable that the said application of the Greater Winnipeg Water District relating to the use of the waters of Shoal Lake should be considered and dealt with by the International Joint Commission.

His Royal Highness the Governor General in council is therefore pleased to approve of the said plan (subject to such conditions and regulations as may be contained in any order in council as provided by section 9 of the said act of Parliament) in order that appropriate action, whether by decision or report, may be taken by the International Joint Commission, without awaiting the disposition of all the matters covered by the said reference under Article IX of the said treaty.

RUDOLPHE BOUDREAULT,
Clerk of the Privy Council.

Mr. MACINNES. In a word, Mr. Chairman, the position of the Dominion Government is simply this, that we are desirous that this application should come before the commission, and on the merits we should be very glad to see the application allowed.

So far as the jurisdiction is concerned it is as outlined by the order in council passed by the Government.

Mr. CAMPBELL. I will put in a copy of the act of the legislature of Manitoba, within whose territorial jurisdiction the Greater Winnipeg Water District lies.

The CHAIRMAN. Authorizing this diversion?

Mr. CAMPBELL. Forming the new corporation. It is the city of Winnipeg and some six suburbs, some of which touch it, and the most important one of which is St. Boniface, just across the river.

Mr. CASGRAIN. Have you a copy of the act for each of the commissioners?

Mr. CAMPBELL. I think I have nearly enough. I made some typewritten copies. I will try to furnish you with them.

Mr. TURNER. Does it specifically authorize the corporation to make this diversion?

Mr. CAMPBELL. No, sir.

Mr. CASGRAIN. Just give us the principal provisions of it.

Mr. CAMPBELL. This statute is largely creating the corporation and giving it its financial and corporate powers, and it does not say anything about where we get water. We can go and find sources anywhere.

The CHAIRMAN. I suggest that, as you present these for the record, you have them marked as exhibits so as to identify them.

Mr. CAMPBELL. I will do that. I would have the Manitoba statute marked "B." Probably Mr. MacInnes's order in council should be "A."

Mr POWELL. As I understand it, Shoal Lake is not within the territorial jurisdiction of the Manitoba Legislature at all; it is in the Province of Ontario.

Mr. CAMPBELL. The boundary line runs through the lake. Ontario has the most of it, but we have two or three bays. Its probable intake would be about a mile from Ontario, but that is not quite clear from our engineers. There is a map showing that, but that is really tentative. The engineers have not decided exactly where they will put the intake pipe, but I think to get deep water you will have to go to Ontario.

Exhibit C would be a copy of the Manitoba Gazette containing the proclamation of the governor of the Province, bringing that

Exhibit B into force. It was delayed until a vote of the electors under a referendum could be taken, and the governor gave his consent.

(The document referred to is copied in the record in full, as follows:)

[The Manitoba Gazette. Published by authority.]

PROVINCE OF MANITOBA,
Winnipeg, Saturday, June 21, 1913.

D. C. Cameron, lieutenant governor, Canada, Province of Manitoba; J. H. Howden, attorney general; George the Fifth, by the grace of God, of the United Kingdom of Great Britain and Ireland, and of the British dominions beyond the seas, King, defender of the faith, Emperor of India.

A PROCLAMATION.

To all to whom these presents shall come, greeting:

Whereas, by chapter 22 of 3 George V, entitled "An act to incorporate the Greater Winnipeg Water District," it is provided that the said act (save and except sections 86, 87, 88, and 89, which came into force on the day said act was assented to) shall come into force on the proclamation of the lieutenant governor in council; and whereas it is deemed expedient to bring into force the provisions contained in said act (save and except the sections referred to);

Now, know ye that, by and with the advice and consent of our executive council of our Province of Manitoba, by virtue of the provisions of the said act above referred to, and of all other power and authority whatsoever in us vested in that behalf, we have ordered and declared, and do hereby proclaim, that on, from, and after the 10th day of June, A. D. 1913, the above-mentioned act (save and except the sections above referred to) shall come into force and take effect.

In testimony whereof we have caused these letters to be made patent and the great seal of our Province of Manitoba to be hereunto affixed. Witness his honor, Douglas Colin Cameron, Esq., lieutenant governor of our said Province of Manitoba, at our Government House, in our city of Winnipeg, in our said Province of Manitoba, this 10th day of June, in the year of our Lord 1913 and in the fourth year of our reign.

By command:

JOSEPH BERNIER,
Provincial Secretary.

Mr. CAMPBELL. As the next exhibit I will put in the Dominion act.

Mr. CASGRAIN. Have you copies of that?

Mr. CAMPBELL. I think I have enough copies for you. This is the act of 1913, chapter 208, of the Dominion of Canada. We applied at Ottawa to the Federal Parliament because of the interprovincial character of the works that will possibly be made, and the duties of the water district as to filing plans and maps are set out in several sections.

(The document referred to, marked "D," is copied in the record in full, as follows:)

[3-4 George V. Chap. 208.]

AN ACT To enable the city of Winnipeg to get water outside the Province of Manitoba. (Assented to June 6, 1913.)

Whereas it has become necessary for the city of Winnipeg to obtain water for the use of the municipal corporation of the said city and of the inhabitants of the said city from sources outside the limits of the Province of Manitoba; and whereas it is necessary for the said city to obtain from the Parliament of Canada certain powers to enable it to carry into effect the public purposes above mentioned; and whereas a petition has been presented praying that it be enacted as hereinafter set forth, and it is expedient to grant the prayer of the said petition: Therefore His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

1. For the purpose of cenveying, from sources outside of the Province of Manitoba to the city of Winnipeg, water for the use of the municipal corporation of the said city,

hereinafter called "the corporation," and of the inhabitants of the said city, the corporation may lay, build, construct, equip, and maintain a line of conduit or pipe from the city of Winnipeg, extending out of the Province of Manitoba and into any other Province; and for the effectual use and operation of the said conduit or pipe may, (*a*) at any place or places in connection with or adjacent to the same, erect, maintain, and conduct waterways and all buildings, machinery, and appliances necessary thereto; (*b*) erect and operate lines for the transmission to the said works of electric motive force or other means of propulsion for the operation thereof; and the corporation may, by the works by this act authorized, take and convey water from such sources to the said city and places adjacent thereto.

2. For the purposes of the said works, and subject to the provisions in this act contained, the corporation may (*a*) enter into and upon any Crown lands without previous license therefor, or into and upon the lands of any person whomsoever, lying in the intended route or line of the works, in order to make surveys, examinations, or other necessary arrangements on such lands for fixing the site of the works, and set out and ascertain such lands as are necessary and proper for the works, including lands surrounding or necessary for the protection or prevention of pollution of any waters to be made use of for the purposes of the corporation; (*b*) purchase, take, and hold of and from any person any lands or other property necessary for the construction, maintenance, and operation of the said works; (*c*) make, carry, or place the works across or upon the lands of any person on the located line of the works; (*d*) construct, erect, and maintain all necessary and convenient roads, buildings, depots, wharfs, and other structures; (*e*) make or construct in, upon, across, under, or over any railway, tramway, river, stream, watercourse, canal, or highway which the said works intersect or touch, temporary or permanent inclined planes, tunnels, embankments, aqueducts, bridges, roads, ways, passages, conduits, drains, piers, arches, cuttings, and fences; (*f*) divert or alter, as well temporarily as permanently, the course of any such river, stream, watercourse, or highway, or raise or sink the level thereof, in order the more conveniently to carry the same over, under, or by the side of the works; (*g*) make drains or conduits into, through, or under any lands adjoining the works, for the purpose of conveying water from or to the works; (*h*) divert or alter the position of any water pipe, gas pipe, sewer, or drain, or any telegraph, telephone, or electric lines, wires, or poles; (*i*) construct, acquire, and use telegraph, telephone, or electric lines and plant; (*j*) from time to time alter, repair, or discontinue the works by this act authorized, or any of them, and substitute others in their stead; (*k*) do all other acts necessary for the construction, maintenance, and operation of the works.

3. The corporation shall prepare and submit to the minister of public works, in duplicate, with an application for his approval thereof, a map or maps, prepared upon a scale of not less than 6 miles to the inch, or upon such other appropriate scale as the minister may determine, and showing the general location of the proposed conduit and works and of any extensions or alterations thereof from time to time, the railways and navigable streams, if any, to be crossed thereby, and shall give such further or other information as the minister may require.

(2) Before approving such map or maps and location, the minister may make such changes and alterations therein as he may deem expedient, and upon being satisfied therewith shall signify his approval upon the map or maps and the duplicate or duplicates thereof. The map or maps when so approved shall be filed with the department of public works and each duplicate returned to the corporation.

(3) The minister, in approving any such map or maps and location, may approve the whole or any portion thereof, and when he approves only a portion thereof he shall signify his approval upon the map or maps and the duplicate or dupicates thereof accordingly.

4. Upon compliance with the provisions of the last preceding section, the corporation shall in each case make a plan, profile, and book of reference of the work.

(2) The plan shall show (*a*) the right of way; (*b*) the property lines and owners' names; (*c*) the areas and lengths and widths of lands proposed to be taken, in figures; (*d*) the bearings; and (*e*) all open drains, watercourses, highways, and railways proposed to be crossed or affected.

(3) The profile shall show the grades, curves, highway and railway crossings, open drains and watercourses.

(4) The book of reference shall describe the portion of land proposed to be taken in each lot to be traversed, giving numbers of the lots and the area, length, and width of the portion of each lot proposed to be taken and names of owners and occupiers, so far as they can be ascertained.

(5) The minister may require any additional information for the proper understanding of the plan and profile.

(6) The plan, profile, and book of reference may be of a section or sections of the proposed conduit and works.

5. Such plan, profile, and book of reference shall be submitted to the minister of public works who, if satisfied therewith, may sanction the same, and thereupon such plan, profile, and book of reference shall be deposited with the department of public works.

(2) Before sanctioning such plan, profile, and book of reference the minister of public works shall be satisfied that public notice of the intention to apply to him for such sanction has been published for at least one month in the Canada Gazette, in the Manitoba Gazette, and in two newspapers published in the Province of Manitoba, one of which newspapers is published in the French language and the other in the English language, and that duplicates of the said plan, profile, and book of reference have been deposited for public inspection in the office of the mayor of the city of Winnipeg during at least one month before such application.

6. The Corporation shall also deposit copies, certified by the department of public works, of the plan, profile, and book of reference, or of such parts thereof as relate to each district or county through which the conduit or work is to pass, in the offices of the registrars of deeds for such districts or counties respectively.

7. This act shall be construed as if the sections of the railway act enumerated in subsection 2 of this section, and also their interpretation according to section 2 of the railway act, but in so far only as they are applicable to the purposes of, and are not inconsistent with this act, were enacted in this act with the following modifications: (*a*) The expressons "the minister" and "the board" shall each mean the minister of public works; (*b*) the expression "the secretary" shall mean the secretary of the department of public works; (*c*) the expressions "the company" or "any company" shall mean "the Corporation" in this act referred to; (*d*) the expression "the railway" means the line of conduit or pipe by this act authorized and includes all property, works, and structures so authorized.

(2) The provisions of the railway act mentioned in the foregoing subsection are those contained in sections 154, 155, 161, 162, 163, 165, 166, 167, 168, 172, 174, 175, 179, 180, 181, 183, 184, 185, 186, 187, 188, 189, and in the sections numbered consecutively throughout from 191 to 220, both inclusive, and also those contained in any amendments heretofore made to any of the said sections.

8. Nothing in this act contained shall prevent the exercise in Manitoba by the Corporation of any powers vested in it by its acts of incorporation.

9. The governor in council may, by order, permit and authorize the Corporation, by the means aforesaid and for the said purposes, subject to such conditions and regulations, if any, as are set forth in such order, to take any waters over which the Parliament of Canada has control or may, for the purposes of this act, exercise control.

10. This act, and any such order, shall be subject, in so far as they apply to any waters sought to be affected, to the provisions of an act relating to the establishment and expenses of the International Joint Commission under the waterways treaty of January 11, 1909, and to the said treaty.

11. So soon as the statute of the Province of Manitoba passed in this present year of the reign of His Majesty and entitled an act to incorporate the Greater Winnipeg Water District has been proclaimed to be in force, this act shall apply and extend to the corporation thereby intended to be created and the references in this act to the city of Winnipeg and to the municipal corporation of the city of Winnipeg shall be read as if made to the Greater Winnipeg Water District and to the Corporation of the Greater Winnipeg Water District, and the references to the inhabitants of the city of Winnipeg as if made to the inhabitants of the said district, according to the boundaries thereof as from time to time lawfully defined.

(2) If the powers of expropriation conferred by the said act to incorporate the Greater Winnipeg Water District are exercised in any way by the Corporation or by any authority created by that act, then the powers of expropriation conferred by this act shall not apply within the Province of Manitoba.

Mr. POWELL. That is the only provision authorizing the diversion of the waters of the lake, is it?

Mr. CAMPBELL. That is all in the Dominion legislation.

Mr. POWELL. There is nothing in the Manitoba legislation?

Mr. CAMPBELL. No; excepting that we can go outside of the Province if we get authority outside.

Mr. TURNER. Have you any authority from the Province of Ontario?

Mr. CAMPBELL. Yes, we have, Senator Turner. I wish to present, as the next exhibit, a certified copy of an order in council, approved by his honor the lieutenant governor of the Province of Ontario the

2d day of October, 1913. Let me say here, gentlemen, to those members of the commission from south of the international line—you will appreciate it at once from the similarity of our two constitutions—when the original Canada was formed, with four Provinces, the natural resources, lands, forests, minerals, and fisheries, belonged to the Provinces—the four old historical Provinces. I do not say that at that time that was admitted, because there was an immense amount of litigation, extending over many years, before it was settled; but it is now settled that the Province of Ontario, as well as Quebec and the eastern Provinces, owned the lands that belonged previously to the confederation, that they retained them, that they did not go to the Dominion. That included forests, minerals, waters, and the fish, even, although in certain respects the Dominion jurisdiction enabled the Dominion Government to make regulations, because the rights of navigation were committed to the Dominion and they could make fishery regulations. That made it necessary for us to go to Toronto, to the Province of Ontario, because the ungranted watershed around our body of water belongs to the Province of Ontario. The bed of Shoal Lake belonged to that Province. If minerals were found there, they would have the authority to give licenses to take them, and they also issue the license and collect the revenue for fishing purposes, although the Dominion Government may make regulations, by order in council, for the preservation of fish as game, and for their regulation. That is why we went to Ontario, because they had the watershed, and they had the bed of the lake, so far as ungranted, as part of their title.

(Mr. Campbell thereupon read Exhibit E, which is copied in the record in full, as follows:)

[Copy of an order in council approved by his honor the lieutenant governor the 2d day of October, A. D. 1913.]

The committee of council have had under consideration the annexed report of the honorable the minister of lands, forests, and mines, with reference to the application of the Greater Winnipeg Water District, comprising the following municipalities in the Province of Manitoba—that is to say, Winnipeg having a population of 191,067, St. Boniface having a population of 9,100, Transcona having a population of 1,632, Assiniboia having a population of 6,000, Fort Garry having a population of 3,000, St. Vital having a population of 1,817, Kildonan having a population of 2,075—for permission to take water from Shoal Lake, in the district of Kenora, for domestic and municipal purposes and advise that there be granted to the said Greater Winnipeg Water District the right to enter upon and to divert and take water from the said Shoal Lake, subject to the terms, conditions, and stipulations set forth and contained in the minister's report.

Certified:

SHONSDALE CAPRIOL,
Clerk, Executive Council.

To his honor the LIEUTENANT GOVERNOR IN COUNCIL:

The undersigned has the honor to report that the Greater Winnipeg Water District, comprising the following municipalities in the Province of Manitoba—that is to say, Winnipeg having a population of 191,067, St. Boniface 9,100, Transcona 1,632, Assiniboia 6,000, Fort Garry 3,000, St. Vital 1,817, Kildonan 2,075—which said district is shown on the map hereto annexed, has represented that the only available source of water supply for domestic and municipal purposes for use in the said district is Shoal Lake, in the district of Kenora, in the Province of Ontario, and the said district has applied for permission to take water from the said lake for the purposes aforesaid.

The undersigned respectfully recommends that there be granted to the said Greater Winnipeg Water District the right to enter upon and to divert and take water from Shoal Lake, in the district of Kenora, in this Province, subject to the following terms, conditions, and stipulations:

1. That full compensation be made to the Province of Ontario and also to all private parties whose lands or properties may be taken, injuriously affected, or in any way interfered with, but water taken within the terms hereof and considered merely as water is not property to be paid for.

2. That the district shall abide by and conform to any and all rules, regulations, or conditions regarding the ascertainment of the quantity of water being taken, and as to the inspection of works and premises, and the manner of carrying out the proposed works that the government of Ontario may at any time see fit to make or enact in the premises.

3. That the water shall be used only for the purposes for which municipalities and residents therein ordinarily use water, and not for the generation of hydraulic or electric power, and the quantity taken shall never, at any time, exceed 100,000,000 gallons per day.

4. That if it should hereafter appear that the taking of said water from Shoal Lake affects the level of the Lake of the Woods at the town of Kenora, and thereby appreciably reduces the amount of power now developed and owned by the town of Kenora or in any way injuriously affects the property of the said town, the Greater Winnipeg Water District shall construct such remedial works as may be necessary to prevent or remove any such injurious effects, and in the case of failure on the part of the said district to construct such works, then the said district shall pay to the town of Kenora any damages the said town shall sustain by reason of the taking of the water as aforesaid.

5. In the event of a dispute between the town of Kenora and the Greater Winnipeg Water District with reference to any of the matters in the preceding paragraph mentioned, the same shall be finally settled and determined by arbitration under the Ontario arbitration act.

W. H. HEARST.

TORONTO, *October 1, 1913.*

Mr. POWELL. Where did your Government get the power to pass an order in council like that, so far as private riparian proprietors are concerned. If there was a grant, say, at Kenora to A, B, or C, that would carry rights which the government of the Province was powerless to meddle with without the power of the legislature. I am not denying that they have it, but my mind is working as to how they got it.

Mr. CAMPBELL. I think that may be worked out between our act from the Dominion Parliament and the powers of Ontario. We might have to invoke the Federal powers they have given us for condemnation of private rights.

Mr. CASGRAIN. Where would the Dominion Parliament have any jurisdiction over lands or private rights in Kenora?

Mr. CAMPBELL. Owing to this being interprovincial, the same as they have under the railway laws.

Mr. CASGRAIN. Do you think that is right?

Mr. CAMPBELL. I think that is right, Mr. Casgrain. The work extending from a point in one Province to a point in another makes it so. Neither Province then can wholly control that work, and for railway purposes, a railway that is interprovincial——

Mr. CASGRAIN. Is not that under a special provision of the British North America act?

Mr. CAMPBELL. We may find a hiatus in the old British North America act. The Provinces have complete control, under section 92, of any private works or local works.

Mr. POWELL. I do not know that it has any particular business here, but there seems in my mind to be a little conflict and a muddle over this thing, because unless there is something more than appears here, why would not the proprietor laugh at your Government at Toronto?

Mr. CAMPBELL. I will try to give you some references on that. We were chiefly relying upon the Dominion statutes for that, to get rid of that difficulty.

Mr. POWELL. Then, if you rely on the Dominion statutes, why do you import the Ontario governor and council into it?

Mr. CAMPBELL. That was really done because they have so much of the watershed of this little lake. It is all a barren and rocky country, and the only thing that has been granted is some property for gold mining rights, 10 or 15 years ago.

Mr. POWELL. And the soil has never been granted?

Mr. CAMPBELL. There is no soil.

Mr. POWELL. Does that apply to Kenora as well?

Mr. CAMPBELL. No. When it gets to them, there is some natural soil.

Mr. POWELL. It may not affect this; it may not have any particular business here.

Mr. CAMPBELL. That is chiefly why we went to Ontario, because we want to protect the watershed and to acquire, for some distance back, at any rate, from the shore of the lake.

I quote from section 92, of the British North America act; section 92, subsection 10, is divided into three clauses:

In each Province the legislature may exclusively make laws in relation to matters coming within the class of subjects next hereinafter enumerated, that is to say—
10. Local works and undertakings, other than such as are of the following classes: Line of steam or other ships; railways; canals; telegraphs, and other works and undertakings connecting the Province with any other, or others of the Provinces, or extending beyond the limits of the Province.

Mr. CASGRAIN. You do not mean to say that a waterworks system comes within that definition?

The CHAIRMAN. It is excluded, as I understand.

Mr. CAMPBELL. It is excluded.

Mr. CASGRAIN. Then you go back to the act of the Dominion.

Mr. CAMPBELL. Then we go back to that.

Mr. CASGRAIN. There is nothing in the act of the Dominion which is authorized by that section of the British North America act. Read that section again.

Mr. CAMPBELL. This is a clause excluding jurisdiction from the Province.

Mr. CASGRAIN. Yes, excluding jurisdiction from the Province, and in certain matters which are reserved for the Federal authorities.

Mr. CAMPBELL. Yes, sir.

Mr. CASGRAIN. Now, read the matters reserved for the Federal authorities and see whether in those matters can be included such a system of waterworks as the present.

Mr. CAMPBELL. It has been well settled under our constitution, in contradistinction to the American interpretation, where the unenumerated powers in the States go to the several States, in Canada they go to the Dominion. If we can find something specifically provided to provincial authority in Canada, the Province may claim it; if it is not, the Dominion may claim it.

Mr. POWELL. That is, the Dominion has the residuum of power?

Mr. CAMPBELL. The Dominion has the residuum of power, and I think the decisions in England have held that between them all legislative powers are included, excepting imperial matters.

Mr. POWELL. A case more strongly in support of you arose between the Province of Nova Scotia and the Province of New Brunswick in respect to a system of reclamation of marsh lands. It became necessary to use the waters of the river dividing the two Provinces for this work, and the courts of Nova Scotia upheld the action which was taken by virtue of the Dominion act. That is about as near as you can get to your case.

Mr. CAMPBELL. I think that would be very close.

Mr. POWELL. But that is not the judgment of a final court of appeals.

Mr. TURNER. Have you thought of this view? This commission is acting under a treaty between Great Britain and the United States, which provides that whenever the Federal Government on either side of the line authorizes the diversion or obstruction of boundary waters, the matter shall be referred to this commission, and it shall allow or disallow. Do you think the investigations committed to this commission involve the delicate determination of constitutional questions as between States and the Federal Government or between the Dominion and the Provinces in Canada?

Mr. CAMPBELL. Between the Provinces and the municipalities, such as Kenora. I am going to submit that that is not really a concern of the commission under the high powers intrusted to it, and that if you find that the local jurisdictions, the local forums, be it administrative forums, like the Province of Ontario, with this broad order in council, or be it our Canadian courts, that any question between two municipalities in Canada is for the local forum to determine, and that your functions are to decide the question so far as it has an international aspect or purview, and that then you can relegate all of us back home to settle our own local disputes. I think your commission would be saddled with overwork if you attempted to settle questions of that kind.

Mr. TURNER. That is the way I regard the questions between the Government of the United States and States on this side of the line, that this treaty took it out of the province of anybody to question before the commission the authority of the General Government. But, of course, if after this commission has acted, as a matter of fact, the authority of the General Government on your side of the line were insufficient to authorize the diversion, I suppose your courts would still have a right to stop it.

Mr. CAMPBELL. Possibly so.

Mr. TURNER. But it strikes me at first blush that this commission would not have a right to disallow it because it is said the Dominion of Canada had no right to give its consent.

Mr. POWELL. In view of that, I suggest it might be none of our business.

Mr. CAMPBELL. I am not quite sure, Mr. Powell, that I catch your point. We want the order from this commission allowing us to take the water, so that no one in the future, after we have spent several millions of money, can question our right. I insisted that we ought to come here to avoid that risk. I at first was impressed with the view that was urged on me, "Our own Province can give us all we want." But after we had gone on and made large expenditures, if some one could induce the political power at Ottawa or in Washington to submit a reference to you and stop us, we did not want to be in that

position, and so we want all, I think, you could give us; all we want is a general power to take water.

Mr. POWELL. What I meant to suggest was that this commission would have to proceed within the lines of this treaty. They could not consider the delicate adjustments of power between the Dominion and the several Provinces.

Mr. CAMPBELL. Then I apprehend it exactly as you do.

Mr. POWELL. But if we were to make an order here in a case where the Dominion did not have any right to give its consent, but where it rested wholly and exclusively with one of the Provinces, I do not suppose that would foreclose the province of your own courts.

Mr. CAMPBELL. No; I do not think it would do that.

Mr. POWELL. There are a number of elements to be considered. In the first place, there is the authority defined in the treaty as the authority of Canada, whatever that may mean. The other is the approval of this commission. Senator Turner says that that element we deal with, we do not deal with the other. Let the courts settle that matter.

Mr. CAMPBELL. Now, we have put in so far, Mr. Chairman, the transmission to your commission of the minister of public works that was before you last autumn, and the order in council read by Mr. McInnes, the Ontario order in council, and I wish to file also an order in council of the Manitoba executive council.

(The document referred to marked "F," is copied in the record in full, as follows:)

To his honor the Hon. Sir DOUGLAS COLIN CAMERON, K. C. M. G.,
Lieutenant Governor of the Province of Manitoba:

Report of a committee of the executive council on matters referred to their consideration.

Present: The Hon. Sir Rodmond Roblin, K. C. M. G. (in the chair), Mr. Howden, Mr. Colwell, Mr. Armstrong, Mr. Lawrence, Mr. Bernier, and Mr. Montague.

On matters of state.

May it please your honor, on the recommendation of the honorable the president of the council, committee advise, that in so far as the Province of Manitoba may be concerned in the waters hereinafter mentioned, consent be, and it is hereby, given to the application of the Greater Winnipeg water district to the International Waterways Commission for leave to take water from Shoal Lake and the Lake of the Woods, situate partly in this Province, for the purposes of the said district.

That in so far as this Province may be or become concerned in the water powers situate upon the Winnipeg River in the said Province consent be likewise given to the said application.

Respectfully submitted.

R. P. ROBLIN, *Chairman.*

I hereby certify that the foregoing is a true and correct copy of order in council No. 22134.

M. MACLEAN,
Clerk, Executive in Council of Manitoba.

EXECUTIVE COUNCIL CHAMBER, *January 6, 1914.*

D. C. CAMERON.

Mr. CAMPBELL. I do not know whether I ought to say it here or not, because no one can say it positively yet, but the policy of Sir Rodmond Roblin, as announced in the address from the throne at the opening of the session, is to form a hydroelectric commission the same as they have in Ontario, and to some extent the same as I believe they have in New York State, to control all the water powers, make them subject to regulation, fixing all prices, and the furnishing of power to municipalities and other local users. Also, I believe the

Province has under treaty now a considerable portion of the riparian shores down to where there are falls on the Winnipeg River below the Lake of the Woods. That second clause is intended to cover that.

I file also, not as giving us any rights, a certified copy of our by-law for raising $13,500,000 for this purpose, with the vote for it and against it. Those money by-laws are with us not submitted to all the electors. We have not quite got the referendum that is familiar near the Pacific coast in your States, Mr. Chairman, but freeholders holding a certain amount of property over incumbrances can vote on it. So that the vote is comparatively small for a city of 180,000 or 190,000. The outside municipalities said they did not care to vote. So the statute I am putting in provided that our electors should pass on it, and there were 2,951 votes for it of the qualified freeholders and only 90 against. I only put that in to show how our own people regard the source of supply.

(The document referred to, marked "G," is copied in the record in full, as follows:)

I, Charles J. Brown, city clerk of the city of Winnipeg, hereby certify as follows:

That by-law No. 8089, a by-law of the city of Winnipeg to approve by-law No. 1 of the Greater Winnipeg water district to incur and create a debt of thireteen and one-half million dollars by borrowing money and issuing debentures for a waterworks system, was submitted to a vote of the duly qualified rate payers of the city of Winnipeg on October 1, 1913, and received the assent of the electors as required by law, the result of the voting being as follows:

In favor of the by-law	2,951
Against the by-law	90

Dated at the city of Winnipeg, Manitoba, this 7th day of January, A. D. 1914.

C. J. BROWN, *City Clerk.*

BY-LAW NO. 1.

A by-law of the Greater Winnipeg water district to incur a debt of thirteen and one-half million dollars by borrowing money and issuing debentures for a waterworks system, including a main conduit between Shoal Lake, in the Provinces of Ontario and Manitoba, and the city of Winnipeg, and the necessary machinery and other plant.

Whereas it is deemed desirable to establish and construct the necessary works to bring a supply of water for domestic and sanitary purposes to the Greater Winnipeg water district from Shoal Lake, in the Provinces of Ontario and Manitoba, including the necessary concrete and steel pipe lines, machinery, and mains, and the scheme of water supply as reported upon by the board of consulting engineers which has been and is hereby adopted and approved by the administration board;

And whereas it will be necessary to borrow thirteen million five hundred thousand dollars ($13,500,000) for the said purposes;

Now, therefore, the administration board of the Greater Winnipeg Water District hereby enacts as follows:

1. This by-law shall take effect on the 30th day of October, A. D. 1913.

2. There shall be created a debt of thirteen and one-half million dollars ($13,500,000) for said purposes by the issue and sale of debentures for a sum not exceeding said amount payable in forty (40) years from their date of issue—March 1, 1914—bearing interest at four and one-half (4½) per centum per annum payable half-yearly on the first days of March and September in each year of and during the currency of said debentures, said debentures to be in such individual amounts not less than one hundred dollars ($100) each, and to be payable at the chief agencies in the cities of London, England; New York, U. S. A.; Montreal, Toronto, and Winnipeg, Canada, of such bank as the administration board may by by-law determine, at which places also the said debentures shall be payable at maturity either in currency or sterling.

3. The said debentures shall be signed by the chairman of the administration board and by its secretary or by such persons as the board may by by-law appoint for said purpose and shall be under the seal of the Greater Winnipeg Water District. The coupons for interest shall be sufficiently executed by having printed or lithographed thereon the name of the chairman, and shall be initialed by the secretary of the board. Each coupon shall be numbered with the number of the debenture to which

it is attached. The debentures shall contain a promise to pay the principal of said debentures and the interest of four and one-half (4½) per centum per annum half-yearly. The coupon shall respectively be for the equivalent on one-half year's interest on the principal sum of the debentures to which they are attached.

4. There shall be raised annually by a levy upon the lands exclusive of buildings in the Greater Winnipeg Water District and in the manner and in the proportions prescribed by the act respecting said district, for a period of thirty-six (36) years, beginning with the year 1918 and ending with the year 1953, the sum of one hundred and fifty-six thousand six hundred and seventy-seven dollars and ninety-five cents ($156,677.95) to form a sinking fund sufficient with the estimated interest at four and one-half (4½) per centum per annum on the investment thereof to discharge the said debt when payable, and also the sum of six hundred and seven thousand five hundred dollars ($607,500) in each of said thirty-six (36) years to pay the interest on said sums at four and one-half (4½) per centum per annum, payable half-yearly on the first days of March and September in each of said years.

5. The total of said two annual sums, namely, the sum of seven hundred and sixty-four thousand one hundred and seventy-seven dollars and ninety-five cents ($764,177.95) shall be raised and levied in each of said years 1918 to 1953, both inclusive, by a special rate sufficient therefor on all such taxable land exclusive of buildings in the Greater Winnipeg Water District as it shall exist from time to time in the manner and in the proportions prescribed by the act respecting said Greater Winnipeg Water District.

6. The principal of said debentures shall be payable on the 1st day of March, 1954. The debentures shall be issued and delivered to the purchasers thereof in such amounts as shall be decided upon by the administration board from time to time during the years 1913 to 1917, inclusive, and thereafter if the same have not all been previously sold or sold and delivered. The administration board may from time to time, pursuant to the provisions of the Greater Winnipeg Water District act issue stock instead of debentures and may as prescribed by said act convert debentures into stock.

7. The interests on such sums of money as shall have been received for debentures or stock and which accrue during the first four years after the coming into force of this by-law, may at the discretion of the board and as authorized by the said statute by paid out of the said proceeds of debentures or stock.

8. Said debentures when so issued and sold and the said coupons attached thereto, when the debentures shall have been so issued and sold, shall be deemed as valid and binding charge in all respects upon the Greater Winnipeg Water District.

9. This by-law shall be submitted to the corporation of the city of Winnipeg for its approval in accordance with the provisions of the city charter and of the Greater Winnipeg Water District.

Done and passed this 6th day of September, A. D. 1913.

[SEAL.] THOS. R. DEACON, *Chairman.*
M. PETERSON, *Acting Clerk.*

I hereby certify that this is a true copy of by-law No. 1 of the Greater Winnipeg Water District passed at a special meeting of the administration board on the 6th day of September, A. D. 1913.

[SEAL.] M. PETERSON, *Clerk.*

Mr. CAMPBELL. There is a telegram, which I have not with me, a general appreciation of our application, from Gov. Eberhart of your State, Mr. Chairman, in which he expresses cordial good wishes for our application, and closes it as a cautious executive should, by saying that of course any order that is made will be made under proper conditions. I can not find it, and I have asked them to repeat it to me so that I can put it on your files. The telegram is well expressed and is in consonance with the spirit that led to the treaty under which this commission is sitting.

The CHAIRMAN. I suppose that, in view of the condition of the southern shore of the Lake of the Woods for the past 18 or 20 years, the people of northern Minnesota would welcome any diversion that would give them back the land that has been submerged in consequence of the dam at Kenora, would they not?

Mr. CAMPBELL. I suppose if we asked to have a great deal more water they would be quite willing.

Now, I am in the hands of the commission. I have one gentleman who could take part of your time, but in view of the discussion so far about powers it seems to me that the issue would be probably better defined if Mr. McLennan, acting for Kenora, the only corporation or person who is disputing our application, should state his objections.

The CHAIRMAN. Do you consider that the commission is officially advised as to the physical conditions with regard to this proposed diversion; that is, as to where Shoal Lake is and what its connections are, if it is connected at all, with the Lake of the Woods? Do you think the commission would be fully advised with the evidence you have presented?

Mr. CAMPBELL. No; not by the evidence to-day. I think the commission know more about it than I can tell them.

The CHAIRMAN. We may know, but we do not know officially in this case. Of course, a court may have private information regarding the facts in a case, but he can not on his own information render a decision.

Mr. CAMPBELL. I thought I would beg leave to call some of the Dominion officers.

The CHAIRMAN. I thought possibly you were relying upon the information which the commission has outside of the record in this case.

Mr. CAMPBELL. To some extent I will, Mr. Chairman, notwithstanding your announcement at the beginning, because I do not believe in carrying coals to Newcastle for a whole winter's supply. But I will try to make enough for the record.

Mr. CASGRAIN. Mr. Campbell, will you then state the grounds upon which you come before the commission? What are the grounds upon which you rely to come before the commission? Why do you come here at all? If you have all these powers from the Dominion Government and from the government of the Province of Ontario, why do you come to us?

Mr. CAMPBELL. Just for this reason, Mr. Chairman, that if this be a boundary water—without my going immediately into that discussion—then we should not go ahead, no matter how much or how august our Canadian authority is, without coming here, because some one may invoke the power of this commission one or two or three or four years hence to say it is a boundary water and you have no right to take this water away, say, from the State of Minnesota.

The CHAIRMAN. In that case the value of your securities would be affected?

Mr. CAMPBELL. Might be affected. Our water system might be affected.

Mr. TURNER. If it is a boundary water, you must come here.

Mr. CASGRAIN. So that your ground is that Shoal Lake is a distinct and separate body of water, or that it is a boundary water forming part of the Lake of the Woods. Which proposition do you stand on?

Mr. CAMPBELL. There is the narrow Ash Rapids between the two. The riffle, the highest point of rock there, is from 2 to 5 feet below the water that passes either way. In, say, April or May the flood waters come into the large lake, Lake of the Woods, and they flow into ours. When those stop logs are taken out of the middle dam——

Mr. CASGRAIN. At Kenora?

Mr. CAMPBELL. At Kenora, and the Backus Dam, ten or twelve thousand second-feet are running there. In one month, two months, or three months, according to the dryness of the summer, that water in the Lake of the Woods goes down, and ours, which have piled up from their flood, flow slowly back.

Mr. CASGRAIN. Would you say that Shoal Lake is an arm or an inlet or a bay of the Lake of the Woods?

Mr. CAMPBELL. I suppose if it was strictly taken I could contend that it was not; that it was a tributary. But we will possibly, in some dry years, when the big lake is high and ours is low, draw water from that lake.

Mr. CASGRAIN. Then it would be a diversion from the Lake of the Woods?

Mr. CAMPBELL. Yes.

Mr. CASGRAIN. Through Shoal Lake?

Mr. CAMPBELL. Through Shoal Lake; and if so, I think that would make it a boundary water.

Mr. CASGRAIN. I do not think that would make it a boundary water, but the question might arise whether this is an indirect diversion of the waters of the Lake of the Woods, which is a boundary water.

Mr. CAMPBELL. Yes. It might make one-fortieth of an inch difference along the shore of Minnesota.

Mr. POWELL. In other words, you might consider the lake as an extension of your pipe line?

Mr. CAMPBELL. Yes. I had not thought of that, but that is a physical effect.

Mr. POWELL. That would be one water that would accomplish the purpose directly. You could utilize the natural condition of things for the same purpose.

Mr. CAMPBELL. As if we put a pipe line to the Lake of the Woods.

Mr. CASGRAIN. The Canadian Government takes the position that Shoal Lake is not a boundary water.

Mr. CAMPBELL. That I must leave to Mr. MacInnes.

Mr. MACINNES. The order in council indicates that while not a boundary water, as far as the definition is concerned, this diversion may be a diversion of boundary waters. That is the result of the investigation that the Dominion Government made.

The CHAIRMAN. Mr. Campbell, there is no other outlet for Shoal Lake than that at Ash Rapids?

Mr. CAMPBELL. That is all.

The CHAIRMAN. So that the waters of Ash Rapids flow into the Lake of the Woods?

Mr. CAMPBELL. Yes.

The CHAIRMAN. And if the waters of Ash Rapids are diverted at some other point away from the Lake of the Woods, you are taking that much water which would otherwise flow into the Lake of the Woods, which is a boundary water?

Mr. CAMPBELL. Just that. That is the necessary result, and we may take some Lake of the Woods water if we lower our own lake sufficiently to make it lower than the other. If Lake of the Woods should happen to be very low, and we should reduce our lake below the riffle of Ash Rapids, then we would have to live upon our own reservoir supply in the small lake.

The CHAIRMAN. With reference to this diversion, it is the same as it would be if it were proposed to divert the waters of Rainey Lake, which is a tributary of the Lake of the Woods. It would be a diversion of the waters tributary to the Lake of the Woods, that go to form the Lake of the Woods.

Mr. CASGRAIN. With this difference, that Rainey Lake is a boundary water.

Mr. POWELL. For purposes of illustration?

The CHAIRMAN. Yes; for purposes of illustration.

Mr. TURNER. Our jurisdiction is to define boundary waters, and in this preliminary article to the treaty they are defined at "the waters from main shore to main shore of the lakes and rivers and connection waterways, or the portions thereof, along which the international boundary between the United States and the Dominion of Canada passes, including all bays, arms, and inlets thereof, but not including tributary waters which in their natural channels would flow into such lakes, rivers, and waterways, or waters flowing from such lakes, rivers, and waterways, or the waters of rivers flowing across the boundary."

The utmost you can say, if this is not a part of the Lake of the Woods, is that it is a tributary of the Lake of the Woods. But this says that tributaries shall not be considered boundary waters for this purpose.

Mr. CAMPBELL. Yes. If it be not a part of the Lake of the Woods, then it is not a boundary water.

Mr. TURNER. You are simply drawing from a tributary and not drawing from the boundary waters, although it may deplete the boundary waters.

Mr. CAMPBELL. The difficulty we felt, however, was the one Mr. Powell has put so pungently, that our putting a pipe in, when the Lake of the Woods was a little higher than our lake, was the same as if we extended the pipe into the Lake of the Woods and took the boundary water which would flow there by necessity through Ash Rapids.

Mr. TURNER. You might extend your pipe into the Lake of the Woods, and then it would be a diversion of that lake. How are you getting rid of this exclusion here, "not including tributary waters which in their natural channels would flow into such lakes, rivers, and waterways, or waters flowing from such lakes, rivers, and waterways"?

Mr. CAMPBELL. I do not think that a very large amount of the rainfall that comes into our lake gets into the Lake of the Woods. The Lake of the Woods feeds us a part of the year. We do send them more water than they do us, because there is no other outlet. But the level is so close that we could not afford to take the risk to say that it was not an arm or an inlet, and only a tributary. I will not complain if you decide it is not a boundary water and you have no jurisdiction, but we want either that decision or an order for us, if the merits entitle us. I am not desirous of urging the question of its being a boundary water.

The CHAIRMAN. It is an outlet to the Lake of the Woods.

Mr. TURNER. Every little stream and river that enters into the Lake of the Woods in that sense is an inlet. This language is undoubtedly inserted here for some purpose. It excludes waters which,

although they may be fed by the outflow from a boundary water, are yet not a part of it.

Mr. CAMPBELL. If you take water from an arm or an inlet, it will affect very slowly, and perhaps very imperceptibly, a boundary water ever so far away.

Mr. TURNER. This includes arms and inlets. If you can sustain the proposition that this is an arm or an inlet of the Lake of the Woods, then it is a boundary water.

Mr. CAMPBELL. At times it will be a receiving basin from the Lake of the Woods. It must have been to the draftsman something like this, a stream whose source is higher all the time than the lake or boundary water, and therefore taking water from it or diverting it would not be affecting the boundary water.

Mr. CASGRAIN. It would affect it, if you take away water. It affects boundary water. Suppose a stream flows into the Lake of the Woods through Manitoba, and you divert that stream; you are taking water from the Lake of the Woods.

Mr. CAMPBELL. Hardly from the Lake of the Woods.

Mr. CASGRAIN. Why not? You are taking water that would flow there.

Mr. POWELL. That is preventing water getting there.

Mr. CAMPBELL. That is preventing water getting there.

Mr. CASGRAIN. It is taking it from it this way, that, if you did not divert it, it would flow in there as a matter of course.

Mr. CAMPBELL. I take it that the Minnesota courts, in a case up near Birch Lake, have been holding that and refusing to grant an order asked for, but on the ground of the Ashburton treaty. If he had had only this treaty before him, which we have before us, I do not think Judge Nelson would have given the decision he did in the Minnesota court.

Mr. TURNER. Your definition of tributary water would probably be correct except that this treaty treats waters both flowing in and flowing out as tributary waters, and calls them so.

Mr. POWELL. If you look at the language used in the treaty you will see one little peculiarity. It reads:

Waters which in their natural channels flow.

As a matter of fact, during three or four months of the year, in the natural condition of things there, that is not the case. It would not flow in for the simple reason that it does not do so, but it flows back the other way.

Mr. CAMPBELL. We have a definition of tributary waters which includes flowing in and flowing out.

Mr. POWELL. Yes, but the movement of waters here is simply for the equalization of the level. That is the only movement there is. It is not an ordinary current, it is simply an equalization of the level.

Mr. CAMPBELL. In the first part of Article 3 is not the effect there shown? It reads:

It is agreed that in addition to the uses, obstructions, and diversions heretofore permitted or hereafter provided for by special agreement between the parties hereto, no further or other uses or obstructions or diversions, whether temporary or permanent, of boundary waters on either side of the line, affecting the natural level or flow of boundary waters.

Mr. POWELL. That is the basis of our jurisdiction.

Mr. CAMPBELL. That is the basis of jurisdiction.

Mr. TURNER. It says boundary waters not affecting the level.

Mr. CAMPBELL. Or use.

Mr. TURNER. Obstruction in boundary waters.

Mr. CAMPBELL. We will have no obstructions, I take it, but we will have the use that may affect the boundary waters.

Mr. TURNER. It does not make any difference whether it affects the boundary waters or not, unless it is boundary waters, because that case is expressly excepted by the preliminary article of this treaty.

The CHAIRMAN. Is it not a matter of fact that this discussion is all based upon the hypothesis that we do not know anything about what are the facts in regard to the flow? I was in the Lake of the Woods last June when the lake was as high as it has been for many years, and the waters of Shoal Lake were flowing into the Lake of the Woods.

Mr. MAGRATH. I think they were flowing into Shoal Lake. There were two engineers there who tested it.

The CHAIRMAN. I know when we went up those rapids we went against a pretty heavy current.

Mr. MEYER. My recollection is that the water was flowing into Shoal Lake.

Mr. CAMPBELL. I do not know that I can usefully address the commission any further on that point, and I will call Mr. Stewart.

The CHAIRMAN. Now, Mr. Campbell, I do not know whether this appeals to you or not, but in our proceedings we have had the witnesses sworn, and I think that is the rule we adopted; then we proceeded to the examination, to bring out such facts as you think are necessary and essential to the proving of the case.

TESTIMONY OF MR. ADOLPH F. MEYER.

Mr. ADOLPH F. MEYER, produced as a witness on behalf of the applicant, having been duly sworn by the chairman, was examined, and testified as follows:

By Mr. CAMPBELL:

Q. Mr. Meyer, you are familiar with the Lake of the Woods country?—A. To some extent.

Q. It has been your professional duty to make some inquiries regarding the physical conditions there?—A. Yes, sir.

Q. What is the area of the Lake of the Woods?—A. About 1,400 square miles.

Q. What is the area of what is known as Shoal Lake?—A. In the neighborhood of 110 square miles.

Q. In giving those areas, are you separating Lake of the Woods from Shoal Lake when you say it has 1,400 square miles?—A. I did not.

Q. You included it?—A. I included Shoal Lake.

Q. Our reports would make them separate, about 1,400 and 107.—A. Various figures have been given, ranging all the way from 1,200, I believe, to about 1,500 square miles, for the Lake of the Woods.

Q. Alone?—A. Without any statement accompanying that figure as to whether it included Shoal Lake.

Q. What is the approximate watershed for the Lake of the Woods?—A. In the neighborhood of 2,600 square miles.

Q. You include in that the entire watershed for that lake and Shoal Lake also?—A. I do.

Q. What is the separate watershed for Shoal Lake?—A. I have not made any personal determination of that, but I have seen the figure of 360 square miles stated in the report of the engineers for the Greater Winnipeg Water District.

Q. Have you reason to believe, from your knowledge of the maps and reports, that that is fairly accurate?—A. I have.

Q. Does that 360 include the 110 lake surface?—A. I believe so.

Q. Will you describe to the commission, in your own way, Ash Rapids and the alternating—if I may suggest that much—heights of the water levels in Shoal Lake and Lake of the Woods, respectively?—A. It was my impression, from a visit to Ash Rapids, that some improvements of the rapids had been made at some time in the past. I am inclined to believe that in previous years there was a ledge of rock in the rapids higher than that which existed at the time of our visit. I am also inclined to believe that Shoal Lake, in a state of nature, was at a higher level than Lake of the Woods; that at the present time—at the time of our visit, at least—the water of the Lake of the Woods was flowing into Shoal Lake, but that there was not perceptible difference in elevation, and that even a change in wind might have resulted in the change in the current between the two lakes.

By Mr. CASGRAIN:

Q. When was that?—A. In June, about the middle of June. The lake was quite high.

By Mr. CAMPBELL:

Q. How long were you there?—A. We were there just part of an hour. I sounded the channel from a canoe, and threw in a chip to see in which direction the waters seemed to be flowing. The velocity was very slow.

Q. Could you say whether the movement of the chip was due to current of water or wind?—A. The movement of the chip, I would say, was strictly due to the movement of the water, inasmuch as we also noticed small particles in the water which seemed to be moving in the same direction, and that the chip was very flat and would offer very little resistance. I doubt whether there could be a surface current in one direction and an undercurrent in another. I do not say that is impossible, but I doubt whether that condition obtained at the time.

Q. That is all you can say as to whether Shoal Lake is a tributary of the Lake of the Woods, or whether it is an arm or an inlet?—A. My personal opinion is that at the present time it is an arm or an inlet; that, in a state of nature, it was a tributary water.

By the CHAIRMAN:

Q. What do you mean by "tributary water"?—A. That it was flowing into Lake of the Woods, that there may have been exceptional seasons when the water in Lake of the Woods rose high enough to flow into Shoal Lake, but that that condition would be very exceptional as compared with the conditions prevailing at the present time, due to the change in levels of the Lake of the Woods and in the condition of the rapids.

Q. What distinction do you make between tributary water and an inlet?—A. An inlet I would consider as a body of water at the same elevation as the main body of water, and a tributary water a body of water which flows into the main body, always in one direction.

Q. I suppose in case of floods in rivers like the Ohio there is a back up in what are otherwise tributaries for all but three or four days in the year?—A. That condition, I believe, should not influence the definition of a tributary water. Perhaps I should have qualified it by a statement to the effect that exceptional conditions of wind or tide, or an earthquake, or any other extremely exceptional natural phenomenon would not change the status of a water as to its being a tributary or an inlet.

By Mr. CASGRAIN:

Q. Could you tell us, from your observation, for how long a time the water of Lake of the Woods flowed into Shoal Lake? Could you give us, from what you saw there, from your personal observation, whether during that summer, for any period of time, the waters of the Lake of the Woods flowed into Shoal Lake?—A. I could not even make an intelligent guess, although I think a computation could be made. In fact, I quite firmly believe computations can be made to indicate in a general way for what portion of the year the water would flow into Shoal Lake, and for what portion of the year it would flow from Shoal Lake into Lake of the Woods; that the answer would apply only for certain specific levels of the Lake of the Woods.

By Mr. GARDNER:

Q. What is the length of the channel between the two bodies of water, approximately?—A. My impression is that there are two narrow channels some distance apart, that the real narrow portion is only perhaps about 100 feet, or perhaps 150 feet, long, and that it widens somewhat on either side.

By the CHAIRMAN:

Q. How wide is it at the narrowest point?—A. My recollection is in the neighborhood of, say, 75 feet. That is merely a recollection, not a measurement.

By Mr. CAMPBELL:

Q. Did you measure how deep the water was at the riffle, or the upper part of the lake below the Ash Rapids?—A. I am not sure that I get your question. We sounded it right opposite the old cribwork, and it was about 6 feet.

Q. Was that the crest of the bed—the highest point? What I want to get at is, how deep was the water at the shallowest part of the Ash Rapids?—A. We made no extensive soundings. The time was short. Two of the commissioners were with us, and we had perhaps half an hour, and we merely went out in a canoe to take some soundings at what seemed to be the controlling section. I would not be able to say that was the controlling section.

By Mr. POWELL:

Q. What is the precipitation there? Is it great or small in that region?—A. Comparatively speaking, small; in the neighborhood of about 21 inches.

Q. If 100,000,000 superficial feet were taken out of the waters in the region of Shoal Lake or Lake of the Woods, it would be about 160 second-feet?—A. One hundred superficial feet? Did you mean 100,000,000 gallons?

Q. One hundred million gallons.—A. One hundred million gallons per day would represent about 150 cubic feet per second.

Q. I made it a little over 160.

Mr. CAMPBELL. You are very close; it is 157 and a fraction.

Mr. POWELL. You are speaking approximately, of course?

The WITNESS. That is 7½ gallons to the cubic foot.

By Mr. POWELL.

Q. That depends on which gallon you use?—A. Yes.

By Mr. CAMPBELL:

Q. You are taking the Winchester or American gallon?—A. Yes; 7½ gallons to the cubic foot.

By Mr. POWELL:

Q. Taking the outflow from Lake of the Woods at Kenora, give us approximately what that is—how many second-feet?—A. Do you mean the average over a number of years, the average over one year, or a minimum of one of them?

Q. Take the maximum and minimum flow there during the year.—A. Your question is not clear, Judge Powell.

Q. The maximum outflow at Kenora and the minimum outflow, just approximately?—A. The maximum, I believe, is in the neighborhood of 25,000 cubic feet per second.

Q. That is, second-feet?—A. And the minimum in the neighborhood of 2,500 to 3,000.

Q. Is that the minimum? There must be some mistake there.—A. The minimum flow that has prevailed during the past years is, of course, a controlled flow and not a natural flow. As to what the natural minimum flow would be I am not prepared to say.

Q. I understand you. What would be the quantity of water that would be available from a watershed of 360 miles, with the precipitation there is there at Shoal Lake?—A. The amount of water available from any watershed is dependent upon so many factors that it is hardly fair to base it entirely upon the precipitation. It depends upon the relative land and water area in that watershed, and the character of the watershed, and a good many factors as to geology and vegetable cover. But, in a general way, I have made a rough estimate in the last few days of what the probable supply would be in a low-water year, and I am inclined to believe that it would not exceed in the neighborhood of thirty-five or forty million gallons per day; that in the past years for which records have been secured over the Rainey Lake watershed there has not been a low-water year. Basing the estimate on the revised records for Rainey Lake watershed, we get in the neighborhood of 65,000,000 gallons. But the minimum rainfall, I believe, was in the neighborhood of 16 or 18 inches over the Rainey Lake watershed, as against a mean of only about 25, indicating that there has not been a period of real low water. For example, in the years 1910 and 1911 on the Mississippi River watershed I believe there was an average of about 11 inches of rainfall, or a run-off of about two and a small fraction inches from that

watershed. That, I believe, would give in the neighborhood of perhaps twenty-five or thirty million gallons from that Shoal Lake watershed.

Q. Per day?—A. Per day.

Q. Now, to bring the whole thing to a climax, if we take 100,000,000 gallons of water, there would be, generally speaking, a continuous outflow from Lake of the Woods into Shoal Lake, would there not?—A. That would depend on the level of the Lake of the Woods at that time, and whether or not water had been stored in Shoal Lake for the dry season. It might be for most of the season, but I would not say offhand that that condition would prevail over the entire season.

Q. That condition would prevail, Mr. Meyer, would it not, as long as the reef of rock was not bare, as long as there was a possibility of a flow that would be true, would it not?—A. It would depend upon at what time of the year Shoal Lake would receive most of its supply, and at what time of the year the Lake of the Woods received its main supply, depending upon control above.

Q. But in the state of nature, or as things are to-day——A. We differentiate, because there is not a natural condition at this time.

Q. Take things as they are to-day, with the present conditions. Would it not be true that, as a general thing, there would be an outflow of water from Lake of the Woods to Shoal Lake if it was tapped to the extent of 100,000,000 gallons per day?—A. I am inclined to believe that in the spring the water would run off from the Shoal Lake watershed, and pour out into the Lake of the Woods, because it would run off more rapidly than from the rest of the Lake of the Woods watershed, and then, for the remaining portion of the season, perhaps eight or ten months, it would flow back into Shoal Lake.

Q. Then, according to your view, the result of this undertaking, if it is carried out, would be that for ten months in the year there would be an actual drain on the Lake of the Woods of its waters?—A. In a dry year—in an exceptionally dry year.

Q. And in ordinary years what would it be, about?—A. In a normal year I am inclined to think that the Shoal Lake watershed would probably supply in the neighborhood of 75,000,000 gallons per day. Perhaps we ought to make that margin large, 75,000,000 to 100,000,000 gallons per day, in a normal year.

By Mr. MAGRATH:

Q. Mr. Meyer, you spoke of the upper rapids. Those are rapids, I imagine, that are located above where we were the time we were in there last June?—A. Yes, that is what I took to be the upper rapids.

Q. Where we were?—A. And where we sounded.

Q. Where are the other rapids, if any?—A. Below.

Q. When those rapids are to be seen, which way would the water be flowing?—A. When the rapids are visible?

Q. Yes.—A. Riffles?

Q. Yes.—A. That is largely a matter of conjecture. It seems to me it would depend largely on the stage of the Lake of the Woods and the condition of the rapids. At the present time the water is so deep, or, rather, at the time of our visit it was so deep, that I am inclined to believe there could be no rapids, that that is a term that survives the condition of a reef somewhere there that has been blasted out.

Q. You did not hear any of those gentlemen who were with us make any statement as to the nature of the rapids at that point?—A. No, I did not. I recall a statement in the gauge records, when the lake was very high, showing that steamboat men report very satisfactory conditions at Ash Rapids.

Q. Did I understand you to say that you regard Shoal Lake itself at the present time as an inlet?—A. At the present time.

Q. What does it let the water into?—A. The Lake of the Woods, if I get your question.

Q. My interpretation of an inlet would be something that lets water in, where the water passes in. We are speaking of the definition of boundary waters being a bay or an arm or an inlet. What is in my mind is this, if you have a boundary water, and if you have a body of water passing from that boundary water into some place else, that that channel is a boundary water. But does it go beyond the inlet, because is it not also an outlet?—A. Your definition of an inlet as being a body of water or a condition of the topography which would allow water to enter seems to me correct. But I do not get the latter part of your question.

Q. Is it not also an outlet, that channel at Ash Rapids?—A. Oh, yes.

Q. And a greater volume of water must be discharged outward than inward in a year?—A. We are inclined to believe that there must be at least some actual run-off from the Shoal Lake waters at all seasons, even though the engineers of the Manitoba hydrographic survey have just reported an evaporation of about 18 inches and a rainfall of about 16 inches at those stations.

Mr. MAGRATH. In Webster's New International Dictionary the definition of an inlet is:

A passage by which an inclosed place may be entered; a place of ingress; entrance; an orifice.

Mr. CASGRAIN. Look down farther and read the definition of an inlet as to water.

Mr. MAGRATH (reading):

A narrow strip of water running into the land or between islands.

That is an inlet. Therefore Ash Rapids and the channel would be the inlet, but Shoal Lake could not be called an inlet.

By Mr. POWELL:

Q. That would depend on the equalization of the surface?—A. A bay might have a narrow entrance and widen beyond it, and yet would come within the terms of that definition, would it not?

Mr. CASGRAIN. I think I will have to postpone the answer to that. Mr. Campbell, just let me ask you, how much water do you propose to take each day?

Mr. CAMPBELL. At present we want 25,000,000 gallons a day. We want a limit of 85,000,000 gallons.

Mr. CASGRAIN. I see in the brief filed by the War Department, or on behalf of the War Department, the following:

It is understood that the present consumption of water in Winnipeg is a little less than 50 gallons per capita per day.

Lieut. Col. POTTER. That is based on the American gallon. The British gallon would put it about 20 per cent more. I made those figures.

Mr. CASGRAIN. What would be the difference in the total?

Lieut. Col. POTTER. It would be 20 per cent more. It would be 92 instead of 77.

Mr. CASGRAIN. How many gallons?

Lieut. Col. POTTER. It would be 50,000,000 British gallons.

Mr. CASGRAIN. It would not be 100,000,000?

Lieut. Col. POTTER. No, not 100,000,000. I have later figures on their report which I got after I made that report. I got the report of the water supply engineering division.

Mr. CAMPBELL. Those figures are correct, 182 second-feet for 100,000,000 British gallons.

Mr. CASGRAIN. Then for the present, Mr. Campbell, the population of the greater Winnipeg district, as it is, you say would take 25,000,000 gallons a day?

Mr. CAMPBELL. That is all we propose to construct for now. As a matter of fact, we are getting only about eight and one half million, and we are short of water.

Lieut. Col. POTTER. You mean your final construction at Winnipeg?

Mr. CAMPBELL. Yes.

Lieut. Col. POTTER. From the lake down you are going to make for the 85,000,000?

Mr. CAMPBELL. Yes; but only make it a little ahead of our population.

The CHAIRMAN. If Mr. McLennan has any questions to ask Mr. Meyer, he will have an opportunity when counsel for the Dominion concludes.

By Mr. POWELL:

Q. Just a moment. Mr. Meyer, under any conditions, if this additional drainage were allowed, there would be some times of the year, and for a considerable portion of the year, a withdrawal of the waters from the Lake of the Woods, would there not?—A. That diversion to be 85,000,000 gallons per day?

Q. Yes, or even less, because sometimes, you see, the water flows out now.—A. Under the present conditions of the lake I would say yes.

Mr. POWELL. There would be. That is all.

By Mr. TURNER:

Q. Would not the question whether a body of water attached to a larger body of water was an inlet of the larger body depend very largely upon whether the smaller body had any independent sources of water supply, or whether its water supply came entirely from the larger body of water?—A. My own interpretation has been that the elevation would govern rather more than the supply.

Q. Suppose you had a body of water which had no source of supply except the large parent body, with a narrow channel. Would not the fact that it had no other source of supply except that channel rather mark it as being connected with a larger body, and therefore absolutely an inlet rather than an independent body of water?—A. Yes.

Q. I was wondering whether, scientifically, that would not be one of the determining factors to determine whether it was an inlet or

not?—A. In my own mind I have not limited the definition of "inlet" to just such bodies, but have had in mind more the relative elevations. That is, take for example, Seine River, flowing into Rainey Lake. Most of the time the water is flowing toward the main body of the lake, and yet there are a number of instances when those waters are practically at the same level as the main body of the lake. I consider those as being inlets, and have considered all bodies of water connected to a main body of water at the same elevation as a portion of that in determining lake areas; have gone up inlet so and so, into which streams flow, to a point where there was an appreciable fall, and have considered that as the area of the body of water.

Q. If the smaller body had its sole supply from the larger body—— A. It would clearly be an inlet.

By the CHAIRMAN:

Q. You are familiar with Shoal Lake, Lake of the Woods, and the topography up there. You are also familiar with the definition of what constitutes a boundary water in this treaty. In your opinion is Shoal Lake a part of the boundary waters between Canada and the United States?

Mr. CASGRAIN. Mr. Meyer's opinion upon that may be very valuable, but I think that a question that must be determined by the commission.

The CHAIRMAN. Certainly.

Mr. TURNER. He has answered that. He says it is an inlet to the Lake of the Woods. We know that is a boundary water.

The WITNESS. I have also answered that it was my belief that in a state of nature it was not an inlet, but was a tributary water.

By Mr. CAMPBELL:

Q. Excepting at exceptional seasons?—A. At exceptional seasons, for a small portion of the year, which I have excluded as having a determining bearing on the definition of "inlet."

By the CHAIRMAN:

Q. I want to ask you one other question. You are familiar with the questions in relation to the Lake of the Woods, and the level of the Lake of the Woods, submitted to this commission by the Dominion of Canada and the Government of the United States on June 27, 1912. Will the proposed diversion in any way affect the conclusions of the consulting engineers, of which you are one, in respect to the answers that should be made by the commission to these questions?—A. I would like to make a general statement in answer to that question, if I may.

Q. Go ahead.—A. This application, I believe, is merely for the taking of water from Shoal Lake. Elevations are given there according to the city of Winnipeg data. The bottom of the intake is given as 324, and high water is given as 335. The constant obtained from the Winnipeg office for reducing from city of Winnipeg datum to sea-level datum is 728.06. That makes the water level 1,063. This is about one foot higher than the records of the past years show actual high water to have been for more than a few days at a time. Extreme records of high water go up to about 1,062.5. It is proposed to build a gravity intake, with an elevation at the

bottom of 324. In the report of the consulting engineers it is set forth that at the entrance there is rocky ground. A certain amount of rock excavation is included. It is set forth that about 37 per cent of the excavation is in the Summit Cut; that this comprises about 9 miles of the aqueduct; that the only expensive construction is due to the long, deep excavation at the Summit Cut; that in order to cut down the expense of excavation, the slope has been made extremely small, the section of the aqueduct extremely large. It would appear offhand, then, that the level of Lake of the Woods is almost a governing consideration in the feasibility of a gravity system of water supply. That in determining this question its bearing upon the whole subject of the Lake of the Woods levels must be kept in mind; that it may be impracticable to construct a gravity intake, due to the increased excavation, for a large portion of it is in rock, if the commission adopts as its range of levels even such levels as have been advocated by the various interests concerned; and that therefore, while the commission may merely grant the right to take water from the Lake of the Woods, the expense involved of lowering that aqueduct, if a low level should be established, might make that particular scheme undesirable, and a system of pumping and a higher aqueduct very much cheaper in the long run. Therefore it must appear that these two questions are intimately related. Now, gentlemen, I have given this matter thought only in the last few days. We have no official notice of the application, it has not been referred to us, the papers that we have have been fixed up casually, and as engineers for the commission in this investigation we of course would like very much to investigate this question in its relation to the entire question of regulation of the Lake of the Woods level.

Q. There is an intimate relation, in your judgment, then, between the questions involved in this application and the question involved in the investigation which the two Governments have made?—A. Considering it in a practical way, I would say by all means.

Q. Would there be any question in regard to the future control of this diversion which is contemplated by the two Governments that this commission should pass upon and make recommendations to them hereafter?—A. I think it is very desirable that some control should be exercised by somebody over all diversions of waters which will affect the level or the flow of boundary waters. That even if the water supply from Shoal Lake itself is sufficient, and that the lake were shut off from the rest of the Lake of the Woods, that very fact would affect the level of the Lake of the Woods, inasmuch as about the ratio of 110 to 1,400, or about one-fourteenth of the total reservoir area is contained in Shoal Lake.

By Mr. CAMPBELL:

Q. Should not that be the relative proportion of watershed? We have a very small watershed compared with the other lakes. Lake of the Woods has a very large one.—A. I was speaking only of the closing of the exits from Shoal Lake, that we considered that in a state of nature it was a tributary water, and that its outlet was closed, and that the water was closed from year to year, so as to utilize it from year to year and equalize the water supply. If that argu-

ment were used, nevertheless, it would be obstructing a certain area from this reservoir, and in that way affecting the boundary waters.

Let me inject a statement here lest my position be misinterpreted. I do not feel that water could be put to any better use than for domestic and sanitary purposes for the Greater Winnipeg water district or any other community that would desire to draw water from the Lake of the Woods watershed. I do not want to be misunderstood in the position I am taking, because it seems to me that is one of the very best uses to which any water could be put.

The CHAIRMAN. Now, Mr. McLennan and Mr. MacInnes, you may inquire.

By Mr. MACINNES:

Q. Mr. Meyer, would this be a correct statement? Ash Rapids is the name given to two small chutes half a mile apart, with a little lake between. Is that the way it is?—A. In a general way that is my impression.

Q. And the little lake between is known as Lock Lake, is it not?—A. I do not know.

Q. Then what is the bay with which that communicates? That is known as Ptarmigan Bay, is it not?—A. I am not very familiar with the local names of those bodies of water, Mr. MacInnes.

Q. (Referring to map.) As I understand it, coming from Shoal Lake toward the Lake of the Woods you come to a narrow part, and then to part of Ash Rapids, then to Lock Lake, then to the remainder of Ash Rapids, and then into Ptarmigan Bay?—A. Yes, sir.

Q. And then Ptarmigan Bay connects over here with the Lake of the Woods?—A. Yes, sir.

Q. This is the Ontario government map.

Mr. CASGRAIN. Are you putting that in evidence?

Mr. MACINNES. Yes; I will be very glad to do it. The map is dated 1899, and the scale is 1 mile to the inch. It is stated here that apparently this part of Ash Rapids is about 50 feet wide, with a depth of water at present of 4 feet 6½ inches, with a channel 8 feet wide.

The WITNESS. What date?

Mr. MACINNES. This was in 1897.

The CHAIRMAN. Mr. MacInnes, that is all right for reference, but so far as the record of this case is concerned, I would suggest that the consulting engineers in the Lake of the Woods investigation have a more complete map than that is. They made one showing the watersheds, and it would be preferable to have that map in the record.

Mr. MACINNES. Quite so.

The WITNESS. This is on a very much larger scale, and has some advantages in indicating the local waters that perhaps our smaller scale map does not have. That has a scale of about 7.89 miles to the inch, and this is on a scale of 1 mile to the inch.

By Mr. MACINNES:

Q. In between is this little Lock Lake?—A. Yes.

Q. Then you come here into Ptarmigan Bay, and Ptarmigan Bay connects here with the Lake of the Woods. This white part is land,

called the Western Peninsula. As to measurements, it says 50 feet wide, with a depth of water of 4 feet 6½ inches, and a channel 8 feet wide. Do you remember how that is? That was in 1897.—A. In a general way that corresponds very approximately to the conditions that seemed to obtain last June, not knowing, however, offhand, what the elevation of the lake was at that time; and it would be necessary to have that in order to interpret those soundings.

Q. This body of water marked as Shoal Lake has a certain watershed. What is the area of that watershed?—A. That, I believe, has been covered by a previous statement. I have not measured it myself, but have seen a figure of 360 square miles given in the report of the engineers.

Q. Apart from any question of water flowing into or out of Lake of the Woods, that watershed you speak of is a source of supply for Shoal Lake?—A. One source of supply.

Q. What is the other source of supply?—A. Lake of the Woods.

Q. Does water flow in and out?—A. Yes.

Mr. MacInnes. Mr. Chairman, instead of that part of the map referring to this, I will put in the whole map here, which is described as a map of the northern part of the Lake of the Woods and Shoal Lake, by the Province of Ontario, scale 1 mile to an inch, 1911. I will also put in a very excellent map prepared by the geological survey of Canada, described as "Geological and topographical map of the northern part of Lake of the Woods, 1897." This scale is 2 miles to the inch. Shoal Lake is there described as Shoal Lake. The commission will also notice the levels that are given there of those lakes.

By Mr. McLennan:

Q. Did you note, Mr. Meyer, the water level marks established on the shore rocks above and below the entrance to Shoal Lake?—A. Will you kindly explain? Do you mean those that were visible at the time of our visit?

Q. Yes.—A. Yes; I did notice them.

Q. How do they correspond?—A. We took only one measurement of a high-water mark, and that was just about 50 feet below the upper rapids, where the excavation had been made, and that, at the time of our visit, as I recall it, was about 11 or 12 inches above the level of the water.

Q. Above the level of the water?—A. At that time.

Q. Did you note how it corresponded with the water line as shown on the rock below the entrance?—A. We did not have time to make any extensive examination, so that I would not be in a position to answer it. In a general way, my impression was that it was about uniform through the rapids.

Q. That is, the above water line——A. Immediately above.

Q. That is, that above the entrance to Shoal Lake appears to you to have been about the same as it was shown below the entrance?—A. We did not go into Shoal Lake proper. We merely examined the marks right at the rapids, and I would not make any statement relative to the marks in Shoal Lake as compared with marks in the Lake of the Woods proper, because we have not yet made an examination of that matter.

Q. Did you not whether the bed of this entrance had actually been disturbed, or whether what you referred to as the excavation would have been the removal of bowlders from the bottom of the stream to permit of navigation?—A. As I said before, it appeared to me that excavation had been made, or blasting had been done. That was an expression to indicate a change in the rapids. I am not ready to say that that was an excavation of solid rock, or the removal of bowlders.

Mr. McLENNAN. That is all.

By Mr. CAMPBELL:

Q. You gave Mr. MacInnes the heights of water as indicated here, but said the datum had not been ascertained?—A. Yes, sir.

Q. Are the conditions of the rainfall and the run-off to the reservoirs the same in the Mississippi country that you refer to as in the northern lake country near the Lake of the Woods?—A. Not entirely.

Q. Is there not, owing to its southern latitude, a larger evaporation in proportion to rainfall in the South than in the North?—A. I would not like to state it in proportion to rainfall. The evaporation differs more with temperature than with any other factor. A station in the North has actually given higher temperatures than in the Mississippi Valley which I quoted.

Q. That you used as an illustration?—A. As an illustration that we have not yet had a period of extremely low water from that watershed; that the relation might be similar; not that it was necessarily 2 inches from the Shoal Lake watershed.

Q. What is about the relative proportion of the watersheds of Lake of the Woods and Shoal Lake?—A. As 360 is to 26,000.

Mr. POWELL. The ratio is 1 to 72.

By Mr. CAMPBELL:

Q. If the water in both lakes fell below the height of the rock at Ash Rapids, then the small lake would be simply a reservoir?—A. For its own run-off.

Q. Could you readily tell how much a foot in depth in Shoal Lake would give in the way of run-off for 365 days?—A. The statement, I believe, is made by the engineers that 1 foot on Shoal Lake would supply 850,000 people about eight and one-half months.

Q. At 100 gallons per capita?—A. Yes.

Q. One hundred million gallons a day; and if that would be for 8½ months, taking it for 12, a little under 17 inches would do for the year?—A. Yes.

Mr. CAMPBELL. I think that is all.

Mr. TURNER. That means that the daily draw-off would be only 17 inches?

Mr. CAMPBELL. Yes; for the smaller lake alone.

TESTIMONY OF MR. ARTHUR V. WHITE.

Mr. ARTHUR V. WHITE, produced as a witness on behalf of the applicant, having been duly sworn by the chairman, was examined, and testified as follows:

By Mr. CAMPBELL:

Q. You have been for some time engineer for the commission, Mr. White?—A. Yes, sir.

Q. And it has been your duty to make investigations, under the submission now pending before the commission, regarding the Lake of the Woods levels?—A. Yes, sir.

Q. You have heard the evidence given by Mr. Meyer. To take the question of the flow through Ash Rapids, tell the commission what your observations have resulted in.—A. In the first place I would like to state that while giving, to the best of my knowledge, an opinion, I do not consider that any opinion based on half an hour's visit only to the mouth, or rather, entrance, to Shoal Lake, and while there not being fully sure whether we were at the first rapids or the second, is the sort of opinion to which much weight should be attached. However, while we were there I saw the chip thrown in the river, and it went toward Shoal Lake, and I believe that it was not the result of wind, but a current; whether the result of undercurrent I am not prepared to definitely affirm, but it is my belief that there was a definite current setting from the Lake of the Woods into Shoal Lake at the time. With respect to alteration in the channel, we had previously been told that part of the channel had been blasted out, and while there we saw rocks, some cribwork, rocks with sharp corners, and it was simply assumed that these were parts of the evidence that the channel had been altered; and, as Mr. Meyer stated, in the gauge record books which were filed with the commission at Kenora there are some references giving the testimony of steamboat men with regard to the condition of navigation in the Ash Rapids at certain times, suggesting that it had been improved. So that it will be inferred from this latter statement that my knowledge about the alteration in the channel is all of a purely hearsay character.

By Mr. MAGRATH:

Q. Do you remember seeing a structure in the channel above the rapids?—A. A cribwork structure?

Q. Yes.—A. Yes; I have some recollection of that. I might say, in that connection, that I had heard that at certain times it was necessary to assist the boats up the rapids with a cable.

By the CHAIRMAN:

Q. With a winch?—A. With a winch; and this is another assumption. I assume that perhaps the cribwork was part of the winch-operating mechanism.

Q. Is it not a matter of fact that there are two rapids going from Lake of the Woods to Shoal Lake, the upper rapids and the lower rapids?—A. Do you ask if it is so?

Q. Yes.—A. I only know from hearsay. I have always understood that, since the matter has been brought to my attention. But I might add that I was under the impression that we were at the lower rapids when we were there.

The CHAIRMAN. That was my impression.

The WITNESS. But from Mr. Meyer's testimony, and from speaking to the gentleman who I understood was Mr. Fuertes, I conclude that Mr. Meyer was correct. But of this I have no definite knowledge; that is, by personal examination.

By Mr. CASGRAIN:

Q. Can you tell us what is the distance between the body of water which is called Lake of the Woods and the body of water which is

called Shoal Lake, passing through these different channels?—A. I would like to refer to the map for that. It could be scaled off.

Q. I wish you would scale it off. I would like to know, taking an ordinary course that you would take in a canoe or a skiff, or any kind of conveyance that would take you up there.—A. This here is called Shoal Lake Narrows [indicating on map]. The other is Shoal Lake. I was going to take from Ash Rapids to the end of Shoal Lake.

Mr. MACINNES. Take it from Ptarmigan Bay.

The WITNESS. Take one measurement there, and then see what the measurement is. [After measuring.] I would say from 5 to 7 miles from Ash Rapids to what might be called the swelling out of Shoal Lake, as shown on this map.

By Mr. TURNER:

Q. Would the watershed around Shoal Lake be sufficient to maintain such a body of water as is there without reenforcement from Lake of the Woods?—A. Do you mean at the present time?

Q. If there was no connection with Lake of the Woods, would the watershed maintain that body of water there, the watershed tributary to Shoal Lake alone?—A. I will answer that in this way: When we were coming to the meeting there were certain things to be gotten ready, and Mr. Meyer undertook to make some of the mathematical calculations with regard to Shoal Lake, in case we were asked. He has a familiarity with some of the areas which I have not, not having worked them over. So that I should consider that my present expression of opinion would not be of value. I would like to add this, however, that while the area of the Shoal Lake watershed, as quoted by Mr. Meyer from the report of the engineers for the greater waterways system, is some 360 miles, the character of the country, with some of this underlying rock formation, would warrant investigation being made to see whether or not, through these underground supplies, the area that really contributed to Shoal Lake was not a larger area than appeared by a delineation of what seemed to be the watershed from the present maps.

Q. Contour maps?—A. Yes; the maps here are very meager.

Q. You thought there might be an underground supply?—A. I thought there might be an underground supply, knowing the character of that country.

Mr. TURNER. What would you say to that, Mr. Meyer?

Mr. MEYER. I would say that is possible. I am not ready to express an opinion as to the probability of it.

Mr. TURNER. Eliminating the question of a possible underground supply, would the watershed tributary to Shoal Lake alone be sufficient to maintain that lake in its present condition?

Mr. MEYER. In approximately its present condition, I would say yes.

The CHAIRMAN. Gentlemen, we will have to take a recess until half past 10 to-morrow morning. The members of the commission from Canada have an appointment with the British ambassador at half past 4, and it is very nearly that time now.

(Thereupon, at 4.10 o'clock p. m., an adjournment was taken until to-morrow, Wednesday, January 14, 1914, at 10.30 o'clock a. m.)

WEDNESDAY, *January 14, 1914.*

The commission met, pursuant to adjournment, at 10.30 o'clock a. m.

Present, all the members of the commission.

Present also, the parties in interest heretofore noted.

TESTIMONY OF MR. JOHN THOMAS JOHNSTON.

Mr. JOHN THOMAS JOHNSTON, produced as a witness on behalf of the applicant, having been duly sworn by the chairman, was examined, and testified as follows:

By Mr. CAMPBELL:

Q. Mr. Johnston, you are hydraulic engineer for the water-power branch of the interior department of the Dominion of Canada?—A. Yes.

Q. You have charge of the reports of the observers at the various water-power stations where observations are made?—A. Yes; I have to a certain extent. They come in to us eventually.

Q. They are transmitted to you from widely scattered points in the Dominion of Canada?—A. Yes.

Q. Have you been at the foot or the outlet of the Lake of the Woods yourself?—A. I was there in August, 1911.

Q. Were you there in pursuance of your official duties?—A. I was there in connection with a reconnoissance trip down the Winnipeg River with respect to the water-power situation in Manitoba especially.

Q. Will you describe the openings or escapeways or mouths of the Lake of the Woods, by which it discharges into the Winnipeg River?—A. There is what is known as the eastern outlet, at which the Kenora power plant is situated. Then the western outlet is located a short distance to the west of the eastern branch, and it is closed by the Norman Dam. The Norman Dam is a regulated dam. It is rock filled, although it is not water-tight. It is regulated by stop logs, and can be used to regulate the lake. Then, farther to the west, there are two artificial outlets which have been constructed, blasted through a rock ridge at Keewatin, to operate two mills there. At the lower end of that reach there is a small trickle of water escapes. It varies at different times of the year. It is partly blocked. There was an old mill there at some time in the past. It is burnt now.

Q. The last-named one, where the old mill was, is not is use?—A. No; not at present.

Q. Nor is the Norman Dam in use for any industrial purpose?—A. Not for hydroelectric purposes. It is being used for regulation.

Q. At the Kenora outlet there is a nice town there, the town of Kenora. Do you know about its population?—A. No; I can not give that offhand.

Mr. CAMPBELL. It is about 6,000, is it not, Mr. McLennan?

Mr. MCLENNAN. Yes.

By Mr. CAMPBELL:

Q. Then who operates the industrial works, and what are they, where the two artificial channels are?—A. The Lake of the Woods Milling Co., I think, is the official name.

Q. What industrial work is there?—A. They have two large mills there.

Q. Speaking generally, do you know what the installation powers are there?—A. They have two mills. Mill A has about 1,900 horsepower installed, and mill C has 2,300 horsepower installed, making a total of 4,200 that is actually installed. Those are the only two mills. Mill B, I think, is in some other part of the country.

Q. Then what is the water consumption at the Kenora municipal plant?—A. Kenora has a power house there in which there are three units installed at present, which would develop 2,500 horsepower, and there is room for three additional units in the plant as at present constructed, and that will double the capacity. At present they would require about 1,700 second-feet to operate their plant.

Q. To its full capacity?—A. Its full capacity. That is the largest amount they have ever drawn into their plant—1,700 second-feet. When the plant is fully completed they will require double that; say 3,500 in round numbers.

Q. Your department takes observations of the consumption of water at the various industrial works, does it not?—A. Yes. They are getting complete records of all the discharges at the Lake of the Woods.

Q. What is the general discharge at Kenora?—A. The largest discharge they have ever had has been 1,700 second-feet, and that was only for, I think, a peak load one day. Usually it runs from twelve to thirteen hundred second-feet.

Q. Now, take what is known as the Norman or regulating dam, where there are no industrial plants served by the water, but which you use for regulating the outflow. I want you to give me the minimum amount that has gone through there.—A. The minimum that we have record of is 2,380 second-feet. That was June 2, 1912. But that is, to a certain extent, provisional. That is our present record. It may be altered when we have our complete records in. But that is the best we can give you now.

By the CHAIRMAN:

Q. Is that the total number of second-feet of all the outlets?—A. No; going through the Norman Dam, wasting through the dam. It was going through the rock fill, a leak through the rocks.

By Mr. CAMPBELL:

Q. That dam consists of a rock fill with 20 or 24 openings?—A. I have not the exact number of openings.

Q. It has quite a large number?—A. Yes, there is a rock fill in the center, circular in shape, an arc of a circle.

Q. And when the stop logs have been lowered into the sluices, and are doing their duty as well as they can, there is still an immense leakage through the rock fill of the main dam?—A. Yes, there is. It has never been made water-tight. The leakage, of course, varies with the elevation of the water in the lake. During the high water of the lake that leakage is as high as 4,400 second-feet, just through the rock fill, with a little going through the logs.

Q. At high water the leakage would be 4,400 second-feet?—A. Yes, as the dam is at present.

Q. Sometimes it goes above that? It varies according to the height of the water; the greater the height the more pressure through the rock fill?—A. Yes.

Q. What do the reports show as to what was happening at that time on the surface of the lake above the dam? Does that represent the full outflow, supposing the lake were remaining level?—A. The data is not given as to that highest reading there, so I can not tell you exactly what the lake was doing at that point.

Q. Can you tell generally what the surface of the lake was doing, whether filling or lowering, during June, 1912?—A. Yes, I can tell you that exactly. During June, 1912, the lake was filling, and it was filling all through 1912 at a fairly rapid rate.

Q. The water, for the years 1911 and 1912, up to the autumn of 1912, was very low?—A. I think that is the lowest stage we had in recent years. I happened to be out there in 1911 when it was down at its lowest stage.

Q. Speaking generally, that would be the lowest stage since the regulating dam was established, about 1898?—A. I can say it was the lowest stage since 1907.

Q. When your records began, year by year?—A. Yes.

Q. And during the whole of the year 1912 the water was rising in the lake?—A. I would not say during the whole year, but taking the year as a whole, it was gradually being filled up.

Q. I do not mean each day or each month.—A. It varied. Sometimes for a week it would go down slowly; but, as a rule, throughout the year it rose.

Q. It was at its lowest, I understand, about what time? It is not essential. It happens to be December, 1911, and January, 1912.—A. I think it reached its lowest point somewhere around September, 1911.

Q. As early as that?—A. Yes.

Q. And then commenced to rise?—A. Slowly at first.

Q. At that time all the stop logs, or nearly all, would be in so as to check the wastage?—A. I will not say that from personal knowledge, but naturally they would be.

Q. So that to get the normal flow from the lake you would have to compute the amount of second-feet that the increased height of water would give during the period, and add it to what your gauging was showing as the escape from the Norman Dam?—A. I do not quite follow that. Would you mind repeating it?

Q. The lake, as I understand it, was rising?—A. Yes.

Q. During this period of very low water, during these readings you have quoted to the commission——A. Yes, I see.

Q. To get the normal flow, the intake of the lake itself, its own intake, if the lake had remained at a uniform level, you would have to add the two together?—A. And also the discharge through the Keewatin Mills.

Q. The mills and the Kenora plant as well?—A. Yes.

Q. And the partly closed old raceway at Keewatin?—A. Yes; which is very small. It can almost be neglected.

Q. Yes; I see the figures give it 100 second-feet when the water is high.—A. Yes.

Q. Would you say it might sometimes go that?—A. I am not very familiar with that opening, but I know it is something very low. It is so low I have not bothered looking into it much.

Q. Did you notice the report about how much went through there?—A. No; I have not noticed that.

Q. I will not bother you to look it up. The observations there are taken in what way, Mr. Johnston?—A. By the approved practice of current meter.

Q. You measure the——A. Take a cross section of the river and establish a station.

Q. You have the width of the river on the surface of the water, and then cross section the bed?—A. Yes.

Q. And you get the square feet of the cross section?—A. And then get the rate of flow through it by means of current meters.

Q. That is the approved and uniform practice among hydraulic engineers?—A. Yes; I think we are following the most up-to-date practice that is possible in that regard.

Q. Do you know whether that is the same practice on both sides of the international boundary?—A. Exactly the same.

By Mr. POWELL:

Q. Mr. Johnston, I want to get the total of the discharge through all avenues, the total discharges of all the outlets at the upper end of the lake.—A. At what date?

Q. Take the minimum in the year, so far as your observations go?—A. I have not all the information here that would give that, but I could give approximately what it should come to.

Q. Give it to us approximately.—A. Early in June, that is, the time of the low flow through the Norman Dam, it would approximately come to 4,500 second-feet. That is at a time when the lake was rising all the time, and the waters were being stored.

Q. When I speak about outlets I mean the flues of the mill, every way of escape.—A. That is what I was referring to. But that is very approximate. I am just remembering and really approximating what was going through the Keewatin Mills at that time, and also what was going through the Kenora plant.

Q. Did you cross section or make an estimate of Winnipeg River below the confluents there, meaning by "confluents" the different discharges?—A. Yes; that has been done.

Q. Have you those figures?—A. No; I have not.

Q. Who has them?—A. We have them in the branch.

Q. That, to my mind, is the point of the whole business, so far as this evidence goes. Another thing I would like to ask you, is there ever a shortage of water for the industrial establishments at the foot of the lake?—A. I do not think they have had any shortage of water. I happened to be there during the time of the lowest water in 1911, and the water in the lake was then at such an elevation that the town was having difficulty in getting water to their plant. That was due to the elevation of the lake, though. The channel to the plant was not deep enough to carry the amount of water at that level to the plant. But there was plenty of water coming down through the Norman Dam at that time.

Q. Then you would say for the present industrial establishments and users of water at the foot of the lake there is an abundance on the surface?—A. Yes, any amount.

By the CHAIRMAN:

Q. If developed to their full capacity?—A. Even if developed to their full capacity, there is sufficient.

By Mr. POWELL:

Q. Another question. Would the withdrawal of 160 second-feet from the waters of the lake have any appreciable effect upon the undertakings at the foot of the lake as they at present exist?—A. No, it would not, in this way: The undertakings at the foot of the lake do not use, and have not used, the full flow of the river, and even when their full installation is placed—that is, the Kenora plant, as I stated, has room for three additional units—even when they are in place and installed there is still, according to our records, and always has been, water enough passing down the river to more than operate them all.

Q. To sum the matter up, if the leakages in the dams, or dam, were stopped, there would be much more water saved—several times over—than would be consumed by the withdrawal to Winnipeg?—A. There would be a great deal more. I can give you some figures, even in the low water in the lake. At low water in the lake there are over 2,000 second-feet leaking through the Kenora Dam. That is at low water. At high water there is more than that leaks through. There is only 160 second-feet going to Winnipeg.

Q. In other words, by stopping the leakage in the dam they would save twelve times the water that would be abstracted by the construction of these proposed works for Winnipeg?—A. Yes.

By Mr. CAMPBELL:

Q. In regard to the town of Kenora and its works, in considering a lake like the Lake of the Woods, it is level all over the surface, is it not?—A. Yes, we have assumed so.

Q. Engineers do not take different levels of the lake as they do on rivers, where the water is flowing?—A. No; it is only disturbed in times of wind, and so forth.

Q. But the run-off at the outlet is so small as compared with an inch or half an inch on the surface of the lake, that that does not change the level appreciably, excepting at the mere place where it is running off?—A. Excepting at the place where it is running off; yes.

Q. Suppose Winnipeg were invading the rights of our water users at the outlet of Lake of the Woods, how much of the 158 second-feet we would take at a maximum would be taken at Kenora?—A. That 158 second-feet would divide itself up among the three outlets in proportion to the discharges through those outlets. That is, a certain part would go through the Kenora plant and a certain part through the Keewatin Mills, and a certain part through the Norman Dam, in proportion to the discharges. That is, if it is a perfectly calm day, and other things were equal. The point is that that 158 second-feet would not be subtracted from the Kenora plant alone. It would be subtracted from all the outlets.

Q. You have computed the number of second-feet that 85 millions per day would demand?—A. No, I have not computed that. I have simply taken the city's figures, being 158.

Mr. CAMPBELL. I think the sum has been done by the commission. It is only a matter of arithmetic, and I need not wait for that, Mr. Chairman.

The CHAIRMAN. No. I would like to ask one question before you leave this subject.

By the CHAIRMAN:

Q. What is the relative amount of water that passes out of the outlet to the Kenora plant?—A. To the whole?

Q. To the whole, yes.—A. It varies from week to week and from month to month.

Q. Approximately?—A. The amount taken through the Kenora plant is fixed by the machinery; that is, they simply take through what they want to develop.

Q. Assuming that it was developed to its full capacity, what would be the relative amount that would go by Kenora?—A. They would require about 3,500 second-feet to develop their complete plant.

By Mr. CAMPBELL:

Q. That is, if they have installed it?—A. That is, when it is finally completed, and at present they only require 1,700. The flow from the lake at that point has averaged, over the range we have records of, about 10,000. I am speaking conservatively when I say 10,000. It has averaged about 10,000 second-feet over the last six years. So the proportion that they use of the mean would be 3,500 over 10,000, practically one-third. But that, you understand, is the mean. It has often gone below that, and it has often gone above that.

Q. But when the flow was largely below that, then those who are in charge of the regulation dam are doing their best to raise the lake?—A. That is the idea of the regulation, yes. The lake could be regulated so that that flow would be uniform throughout. That is what we would wish.

Q. I understand that you have made a computation of the depth of water over the surface of the Lake of the Woods that Winnipeg would take in a year at 85,000,000 gallons per day. That is, assuming that all the water that we took in the year came into the lake in one day, what depth would have to be conserved there for the water district's use for the 12 months?—A. That was worked out in our Winnipeg office, and I believe it was 1.42 inches; 1.42 inches on the lake would supply the complete Winnipeg requirements for the year.

Q. That is, 158 second-feet?—A. Yes.

Q. For the 365 days?—A. Exactly.

Q. Then, assuming that we got all that water on some one day in April or May at the high-water time, there would be still water coming, as a matter of fact, into the Lake of the Woods all summer?—A. Yes; during the high water period we would always have an enormous excess over the low-flow conditions during the winter, and a storage of that sort would really only be necessary over a few months; that is, if it came down to a fine point, where storage was required for it. Under present conditions storage is not required for it at all, of course.

Q. Under present conditions no consideration need be given to that little less than an inch and a half?—A. No; not so far as storage is concerned, at all. There is ample extra water being wasted on the river now which would make that.

Q. But assuming that strict consideration had to be given to it, would the six months of conservation on our supply be sufficient, considering that water as coming into the Lake of the Woods all the time, even after the high-flow period has passed?—A. Yes; there is

no doubt about it that six months would cover the low-water period in any average year.

Q. I am assuming that there is some regulation being carried on at the outlet. So that practically three-quarters of an inch, to be mathematical about it, without regard to present practical purposes, would be all that would have to be stored, if we had to ask some special water to be kept for our use?—A. Yes; on that basis three-quarters of an inch would be all that would be required; that is, assuming that the high water for six months would be such that it would supply you with your required quantity.

Q. In the lake there is always room for that much water?—A. Yes; three-quarters of an inch on the lake does not make any appreciable difference to any interest.

Q. The taking of this water by the Winnipeg District will not affect navigation, I assume, adversely?—A. I am not in a position to speak for navigation interests, but three-quarters of an inch in depth would make very little difference one way or the other. So I do not think navigation interests would be affected by the withdrawal of the water.

Q. Assuming a regulated discharge at a moderate figure, not to put it as low as you can, what percentage would our 158 feet be?—A. It would be about 2 per cent, I think.

By Mr. MAGRATH:

Q. Did you give the total amount of water necessary for the existing industrial development of the north end of the Lake of the Woods in your evidence?—A. Yes; I think I did. You include the Keewatin Mills as well?

Q. Yes.—A. About 4,000 second-feet.

Q. And then you said that to give Kenora the full amount necessary for its plant, it would require much additional?—A. About 1,700 more.

Q. That would be 5,700 second-feet?—A. Yes.

Q. Did I understand you to say that the average discharge in the lowest season was something about 10,000 second-feet?—A. No; that was the average, including all the high water and low water for a period of six or seven years, and that 10,000 I do not want to make an arbitrary number at all, because we are still watching the final revised returns from our discharge. Our engineers are still working on it, and it may be reduced; also, it may be increased. But that was intended to represent the average condition for a period extending back to 1907, from 1907 to the present. During the low-water season it has gone down much below that, and during the high-water season it has gone up enormously above it.

By the CHAIRMAN:

Q. Has it gone, at any of the low-water periods, below 5,700 feet?—A. I would not want to say whether it has or not. The records that we have below the lake are governed to a certain extent by what they are storing in the lake, how many stop logs they have in the dam, and for any particular day's records which we have below the dam it may not represent the true discharge of the river, because if they put in two or three extra stop logs it cuts off that water; and until the lake rises to a level that would discharge automatically, through the openings, the amount entering, the readings below are in error, they do not represent the amount coming through. We

have no records yet as to what the absolute minimum has been. It requires calculation, and a very careful study of the operation of the stop logs in the dam, in conjunction with the discharge measurements. But we know this, that with the regulation of that dam there is not the slightest trouble at all in maintaining that discharge at 5,700 feet throughout the year, if the dam is regulated by some intelligent body that understands what is required, and if we have regulation on the lake.

By Mr. McLENNAN:

Q. That would have in contemplation either the using of the Lake of the Woods for storage purposes, or tributaries and adjoining waters for storage purposes?—A. Yes; it would be in contemplation of the use of Lake of the Woods for storage purposes.

Q. So that it is on that idea that you would base what you say as to your ability to maintain that flow throughout the year?—A. That is on the basis of having Lake of the Woods as a storage basin?

Q. Yes.—A. Decidedly.

Q. To make the Lake of the Woods a storage basin would mean that you would have to hold the water there in flood times and simply allow it to pass away as required?—A. Yes; that would be the idea.

Q. That would be inconsistent, would it not, with the maintaining of a uniform level in the Lake of the Woods?—A. Yes; it would be absolutely inconsistent.

Q. To maintain that flow without using the Lake of the Woods as a storage basin, then, you would have to seek storage in other places?—A. Certainly.

Q. And I do not know whether you are familiar with the surrounding country, but Shoal Lake is naturally situated favorably for storage purposes, is it not?—A. I have never been on Shoal Lake myself. It could be separated from Lake of the Woods comparatively easily, I understand.

Q. Yes; there is a very narrow passageway between the two. It is a large body of water connected with the Lake of the Woods?—A. Well, yes; it is a comparatively large body of water, and it could be closed off from the lake. The area is somewhere in the neighborhood of 100 square miles.

Q. Are you aware that it acts as a storage reservoir by reason of the fact of its narrow passage that fills up Shoal Lake during the high-water times of the Lake of the Woods; then, as the water recedes in Lake of the Woods, there is an outflow for a considerable time throughout the low-water periods in the Lake of the Woods?—A. Yes; I understand that is the case, from what I have been told, that there is quite a current; in fact, they call them "rapids."

Q. So that Shoal Lake has been operating naturally as a storage reservoir to the advantage of the levels of the Lake of the Woods, both in high-water time and in low-water time?—A. I can not say to any great advantage. If there was no current there at all, if that connection between Shoal Lake and Lake of the Woods was deep so that there was no current there, Lake of the Woods would have the same advantage of the storage in Shoal Lake.

Q. Would not 4 or 5 feet of a depth there answer the purpose of that connecting channel?—A. The point would be the area of the

Lake of the Woods, without Shoal Lake, is, roughly, 1,400 square miles; with Shoal Lake it is 1,500 square miles. The storage facilities of the lake are small in proportion to its area. If that hundred square miles was at the same level as the lake all the year round, then we could have the Shoal Lake regulation and the Lake of the Woods regulation all operated from the Norman Dam. You would have the full advantage of Shoal Lake.

Q. By using Lake of the Woods for storage?—A. Yes. If it was a question of using Lake of the Woods and Shoal Lake as storage, if they were both at the same elevation, you would have just as much advantage; in fact, it would be better for power purposes to have them at the same regulation, because we would have that extra 100 square miles. I do not know whether I am getting at the point you are getting at or not.

Q. I will put it this way: The fact that by reason of the narrow connecting channel the water is retained in Shoal Lake long after it has gone down to low water in Lake of the Woods, and there is a strong outflow from Shoal Lake, does not that materially assist in the keeping up of the low levels in Lake of the Woods and the supplying of water for the powers at the lower end?—A. It does and it does not. The point is this, if Shoal Lake were at the same level, Lake of the Woods would not go down so fast. You see there is a certain amount of water, according to your theory, being retained back in Shoal Lake which otherwise would have been available to draw on, and the result would be that the lake would not have gone down as fast.

Q. But we do not need it so badly until Lake of the Woods gets comparatively low?—A. No; exactly.

Q. Then we still have water in Shoal Lake coming out?—A. Yes; you do.

Q. So that would it not be more advantageous to be getting that water when we need it worst?—A. Yes; it would be an advantage in some ways. It would necessitate, though, some sort of controlling works at the outlet of Shoal Lake.

Q. But, naturally, do you not understand that it now operates in that way?—A. It operates in that way, but I do not think the effect is very marked. I think the effect is very small at present.

Q. In speaking of there being abundance of water to supply all of the industries and powers at the lower end of the lake, you are speaking of the present conditions, are you not?—A. Yes.

Q. In fact, I do not know that you have personal knowledge since 1911. Are you aware that there has been a further unit installed at Kenora?—A. A fourth unit?

Q. Yes; since 1911.—A. That would make some difference in these figures.

Q. It is in operation to its full capacity.—A. The plant itself will only stand two additional, six in all.

Q. With a minimum capacity of 5,400, I think?—A. Yes.

Q. Are you aware that during the low-water time to which you have referred, and with all the stop logs in at the Norman Dam, the town of Kenora, with other parties interested, had to expend considerable money in stopping the leakage at the Norman Dam, and that considerable work was done in that connection?—A. I understand that they did. At the same time, the leakage still went through

the Norman Dam. It was not due to lack of water that that expense was caused; it was due to lack of elevation in the lake. The low water in the lake prevented the water getting to the Kenora plant. Simply by looking at the dam when I was there I judged there were at least 2,000 second-feet escaping through the stop logs and through the rock fill.

Q. Did the figures you gave us of the leakage refer to before or after the work had been done to prevent the leakage?—A. The records on which those were based were taken at a time when all the stop logs were in, and I think they dumped straw, or some substance, around the stop logs to try to prevent leakage through the logs. That simply represents the leakage through the rock fill.

Q. Was it taken before or after the work was done to prevent the leakage through the rock fill?—A. What time was that work done?

Q. I can not tell you just now.—A. These were based on readings made in 1912, from June to September.

By Mr. CAMPBELL:

Q. June, 1912, to September, 1913?—A. To September, 1912. From June 5 to September 30, 1912.

By Mr. MCLENNAN:

Q. Can you tell me the estimated amount of power capable of development at the head of the lake, at the Kenora end?—A. Do you mean the combined?

Q. The combined.—A. That would depend entirely on what we could regulate the flow to. If the Lake of the Woods was not used as a regulating basin, it would depend on the present minimum flow through the openings.

Q. If the Lake of the Woods can not be used as a storage basin, it would depend on the minimum natural flow?—A. Yes; without its regulation.

Q. Unless waters tributary to and adjoining the Lake of the Woods can be used for storage purposes?—A. Yes. Of course, that is a qualification. But the lakes tributary to Lake of the Woods are not of any great size in comparison to Lake of the Woods. Lake of the Woods is the ideal point of regulation.

Q. Lake of the Woods is the ideal point for regulation?—A. The dam is already in there.

Q. And apart from the regulation of the Lake of the Woods, so far as you know, Shoal Lake is the only important point at which regulating could be done?—A. That could be cut off; yes.

Q. Can you give me an estimate of the power at that end under natural conditions?—A. That depends on the minimum flow, which, as I stated a short time ago, we have not. I can not tell you what that minimum flow is, the minimum natural flow from the lake. It depends not only on the discharge measurements, but also on what storage was going on at the same time and the stop logs were in Norman Dam.

Q. This regulating dam that you refer to is a power dam built by the power company, is it not?—A. It was built, I think, with the intention of establishing a power plant.

Q. So that it was not erected for the purpose, nor is it to-day maintained simply for the purpose, of a regulating dam, but until the power is fully developed it is used for that purpose?—A It was

erected for the purpose of regulating as well as for the purpose of a power dam. The original layout provided for two power houses, one at each side. I think it provided for eight sluices, leading to power houses, four on each side. The remaining sluices were simply stop-log-controlled sluices, which could be used to regulate the lake as was necessary. It was absolutely necessary that a provision for regulation like that be put in to take care of the floods.

Q. I will call your attention to this, a fact of which you may be aware. The Ontario government, after the erection of this dam, made an arrangement with the Keewatin Power Co., the owners, by which they allowed them a certain amount for the use of the dam for regulating purposes meantime until power could be developed?—A. Yes; I am aware that there is an agreement of that sort.

Q. And I believe it is common knowledge that that power has recently changed hands with the idea of development.—A. I have no personal knowledge of that at all. I have heard something of it, but that is all I know; just a rumor.

Q. And you perhaps have heard of the project of developing the power there at once; at least, in the immediate future?—A. No; I have not heard anything of that.

Q. When that power is developed, it will be developed with a view to taking the natural flow of that channel?—A. It will be developed with a view to taking whatever can be supplied. Whatever company would develop there would naturally want to regulate the flow in the lake to get the greatest benefit from it. It is hard to foretell now what their views might be.

Q. And with a view to getting as much power as they can from it?—A. Yes.

Q. And naturally would look to the full natural flow of that channel as being their share. Would that be the idea?—A. Yes; I suppose they would.

Q. And with the full natural complement of water being taken to operate the power in the western outlet, would you say that there might not be difficulty in finding water for all of those powers?—A. It depends entirely on the extent to which the lake is to be regulated. If it were regulated ideally—that is, if a certain amount of water were discharged from that lake every day in the year, from year to year, dry years and wet years throughout—that would mean that every cubic foot of water from the watershed above was being utilized. That is an ideal condition which would be impossible to realize, of course. But that would be a condition which would probably be aimed at. But it never could be realized. There would be always a certain amount to come and go which could not be brought down to that fine point of regulation.

Q. And in aiming at the full development and advantageous use of the water powers there you have to keep in mind a careful conservation and storage of the waters?—A. Exactly.

Q. What you would say is that the water powers situated at that point, including the Kenora power, when the other one has been fully developed would require very careful handling to be insured of sufficient water at all times?—A. That depends entirely on the capacities of the plants which would be installed. They would naturally be installed to meet the conditions which were to be expected, or the conditions which existed, and to conform with existing interests.

Q. Two or three of them, the Keewatin and the Kenora, have an interest in that?—A. Yes, any interests that have to draw on the water. Any future plant would have to be built with that in view.

Q. There has been no delimitation of the powers of that kind as yet?—A. I am not aware of the exact terms upon which either the Keewatin mills or the Kenora plant have their leases based. I am not aware of what exact rights they have there.

Q. Are you speaking, Mr. Johnston, from personal observation when you say that the trouble that Kenora was having in 1911 was not due to the level of the lake?—A. Yes; that is personal observation. I know that for a fact, because I was there in company with Mr. J. R. Freeman, of New York, and Mr. J. P. McCrea, of Ottawa, and Mr. D. L. McLean, who was in charge of our Winnipeg works, and we stood at the headrace leading down to the Kenora plant and we remarked—I have just forgotten whether it was Mr. McCrea or Mr. Freeman—remarked that if it was lower than that they would have trouble getting the water in the turbines, and when we went into the power house the engineer in charge there stated that there was a mixture of air and water being drawn in as it was, and they could not stand any further lowering. But immediately afterwards, on going over to the Norman Dam, we found at least 2,000 second-feet of water escaping through the leakage. So it was not a question of lack of water, but a question of elevation. That was when the lake was at about its lowest point.

Q. There was sufficient water if none had been getting through the other place?—A. Yes; if it had been conserved there would have been any amount of water.

Q. Would it not be that the level of the lake, notwithstanding, caused the difficulty with the Kenora power at that time?—A. If the lake had been 2 feet higher, they would have had no trouble; that is, supposing the same amount of water had been running and the lake had been 2 feet higher elevation, there would have been no trouble at all. It was due to the elevation of the water, not the quantity.

Q. Not high enough to get over the——A. (Interrupting.) The headrace into the plant. It was going through the headrace in the form of rapids. There was quite a little fall, breaking over the rock bed. I think there was probably a drop of 6 inches from the lake to the power house, just due to the rapids, which were formed in the headrace. That was about the end of August, 1911. If I remember rightly it was August 26, but I am not absolutely certain as to that date.

By Mr. POWELL:

Q. Mr. Johnston, the failure to maintain the higher level of the water of the Lake of the Woods would naturally result in a greater consumption of water also, would it not?—A. I did not quite catch that.

Q. The failure to maintain the level of the Lake of the Woods at a higher point would necessarily result in a greater consumption of water, because the water would not be so powerful; they would require more of it?—A. They would require more of it for the same output of power.

Q. So in two ways the then situation was bad. In the first place, through the introduction of air with the water, and in the second

place the water, after you got it to the wheel, was not as powerful as if it was under a higher head?—A. Exactly; that is right.

By Mr. McLENNAN:

Q. I do not know whether you ascertained that, but with ours a low level—that is, a fairly low level of the lake—ordinarily gives it a better head. That is by reason of the tailrace.—A. I see.

Q. That is, when there is no outflow from the other channel that comes around and comes into the tailrace.

By Mr. POWELL:

Q. That is backwater?—A. Backwater. Our power is ordinarily stronger with the low water until it gets too low.

Q. Have they not overcome that by the introduction of Swiss wheels which run in backwater, which is the very essential condition of their successful operation? When I was there they were transforming the whole water system of the Keewatin Flour Mills and introducing Swiss wheels for that very purpose, and the backwater is a very essential condition of running it at all.—A. Yes; there has been no change made in the Kenora plant.

Q. There was at Keewatin, because I was there when they were installing them. They are great, big shields, trumpetlike, and the idea of the Swiss wheel is to run the propeller or the wheel in a solid column of water in a way to get a great deal more power than if you allow it to disperse, as in the turbine wheel, when it goes from the bucket. So they were getting a much more economical wheel.

By Mr. McLENNAN:

Q. Speaking of the reduction of the level of the lake by approximately an inch and a half in the year by the taking of 85,000,000 gallons of water, assuming that all the outflow of the Lake of the Woods was being utilized each year, and a reduction of that amount continuing from year to year, it would eventually be serious, would it not?—A. No; I do not think that you look at it from the correct standpoint. The water in a regulated lake during the high-water period will be conserved for use during the low-water period. Until the river is regulated to its final, ultimate capacity, there always will be a surplus which is not conserved. That surplus is always available. The regulation of that lake under ideal conditions, the ideal conditions I pointed out previously of a fixed amount day in and day out and year in and year out, is something which will probably never be attained absolutely. There always will be something to come out and go in, simply because that fixed amount that we determined can not be determined now—that is, that fixed average amount. It depends on the measurements, extending over a longer period of years than we now have record of. You can not consider 1.42 inches, which would be sufficient for the city plant, as being a call on the lake every year. If the lake was lying dormant, with nothing coming in and nothing going out, the city would only draw 1.42 inches from it in a year; that is, it would only lower 1.42 inches on the lake, which would supply the city with 85,000,000 gallons for an entire year. But during that year the river is flowing in and out. The high-water period comes and the low-water period comes, and sufficient excess of the high flow can be retained with only, say, three-quarters of an inch—supposing you allow us a six months' period of high water and six months of low—with only three-quarters of an inch on the lake to supply the

city itself. Even then you are not figuring on true conditions, because that absolute loss to the powers at the outlet of the lakes will never take place until the river is absolutely regulated to the highest possible degree of finality. There is always a certain amount of surplus which the regulation will not take care of.

Q. I suppose the sum total of it is that there would be approximately an inch and a half that can not be utilized by water powers?—A. The flow of the river is variable. It varies from year to year. You can never be absolutely certain what that unbroken flow is going to be. The next year's reading may lower or raise it.

Q. The utilization of the water powers there to advantage depends, in your judgment, on the storage and conservation of the waters?—A. Most decidedly.

Q. And how that can best be done?—A. Yes.

Q. And your ideas are being based largely on using the Lake of the Woods for storage purposes?—A. It is the essential point.

Q. Unless other means of storage can be obtained?—A. It has a great area, and the fact that it is already partially controlled renders it the cheapest point at which conservation can be made.

Q. That would necessitate, would it not, holding it up to high levels in high-water time?—A. That is a point that is before the commission in other form.

By Mr. CAMPBELL:

Q. One point on Shoal Lake as a regulator. The high water in Shoal Lake is due to the coming in of Lake of the Woods water, I believe?—A. That is what I understand. But, as I say, I have never been out there myself.

Q. That being so, Shoal Lake will not rise at any one moment from Lake of the Woods water any higher than Lake of the Woods itself? Lake of the Woods will not hydraulically lift up water?—A. No.

Q. Then, as soon as Lake of the Woods commences to recede, to go down, Shoal Lake will commence to go down, slowly or rapidly, according to the necessity of Lake of the Woods?—A. Exactly.

Q. So that there can not be much regulation there by a state of nature?—A. Not by a state of nature.

Q. Unless they put in a dam and hold Shoal Lake at a certain level?—A. Exactly.

Q. Would that be of any great benefit to Lake of the Woods, just paying back her own water to her? As I understand conservation, it is the tributary that is held up, dammed up, until its water is needed?—A. There is some territory, of course, tributary to Shoal Lake which would supply it.

Q. I suppose at some seasons of the year Shoal Lake's own watershed would give Lake of the Woods something?—A. But generally its elevation is dependent entirely on the elevation of Lake of the Woods.

Mr. CAMPBELL. That is all.

By the CHAIRMAN:

Q. Mr. Johnston, I do not know whether I understood you correctly or not, and for my own information I want to ask you, does this 1.42 inches represent the aggregate extent to which the Lake of the Woods would be lowered by the consumption of 85,000,000 gallons throughout the year?—A. It represents much more than the aggre-

gate. That represents the extent to which it would be lowered if no water was flowing in and no water flowing out.

Q. A year's consumption?—A. A year's consumption would lower the lake 1.42 inches, provided it was just a lake with nothing coming in and nothing going out except the city's supply.

Q. So that the actual lowering of the level of Lake of the Woods by reason of this diversion would be almost imperceptible?—A. Almost imperceptible.

The CHAIRMAN. That is all.

The WITNESS. I was going to leave this record of discharges through the Norman Dam with the commission.

Mr. CAMPBELL. Yes, and I will furnish the commissioners with duplicates.

The WITNESS. These discharges were taken by the engineers of the Water Power Branch, and they represent the discharges from June 6, 1912, to September 30, 1913, and they are, of course, subject to revision upon the completion of our work.

TESTIMONY OF MR. J. B. CHALIES.

Mr. J. B. CHALIES, produced as a witness on behalf of the applicant, having been duly sworn by the chairman, was examined, and testified as follows:

By Mr. CAMPBELL:

Q. Mr. Chalies, you are superintendent of the water-power branch of the Dominion Government?—A. Yes.

Q. And have charge of the Government's dealings with control of water powers and the granting of leases and rights?—A. Yes.

Q. You are acquainted with the general geographical or topographical situation at the outlets of Lake of the Woods?—A. Well, generally.

Q. You know of the town of Kenora's water supply?—A. Yes.

Q. And the Norman Dam?—A. Yes.

Q. The Lake of the Woods channels for their two big mills?—A. Yes.

Q. And some disused channel for an old mill that is destroyed?—A. Yes.

Q. What development has there been of water power below Lake of the Woods in the Winnipeg River? I do not mean the extent of it, but who has developed it?—A. The city of Winnipeg itself has a development at Point du Bois Falls on the Winnipeg River.

Q. That is the outlet of Lake of the Woods?—A. No, that is the main river, in the Province of Manitoba.

Q. But the Lake of the Woods water runs there?—A. Oh, yes.

Q. What other development is there?—A. The Winnipeg Electric Railway Co. has a development on the same river.

Q. Has anyone else developed?—A. No.

Q. What is your estimate of the total power capable of being developed on the river, speaking generally, that will depend on conservation and other questions?—A. There is about 253 feet natural fall of the river which can be concentrated at different points and used for power. At the minimum flow of the river under natural conditions it is possible to develop about 237,000 24-hour horsepower at 75 per cent efficiency. With regulation that can be practically doubled, about 410,000 horsepower.

Q. Which Government controls the granting of power rights down the Winnipeg River?—A. The Dominion Government.

Q. All those powers there are in the Province of Manitoba?—A. Yes.

Q. And it is one of the peculiarities of our history that while the old Provinces of the confederation retained their natural resources, Manitoba came in and the Dominion held them as under purchase?—A. Yes.

Q. So that in Ontario the Province of Ontario controls the power rights and a great many others, while in Manitoba the Federal Government does so?—A. That is it.

Q. Have any other rights been granted or arranged for besides these two, the city and the electric railway company, which have been developed?—A. Yes. An agreement under the Dominion of water-power regulations was granted a short while ago to Sir William White, of Winnipeg, acting for Winnipeg interests, authorizing a power plant at Great Falls on the Winnipeg River.

Q. They have not done any work yet?—A. They will start in the spring.

Q. They are making their arrangements, but they have not done any work on the ground yet?—A. Not yet.

Q. No others have done any work either?—A. No. All the other powers are under the control of the Crown.

Q. And are still within their grant?—A. Oh, yes.

Q. What have you to say as to the effect of our taking an amount of, but not exceeding 158 second-feet of water per year for Winnipeg waterworks, upon the powers at Lake of the Woods, and especially upon the Kenora plant?—A. I can only reiterate Mr. Johnston's opinion. I think that the effect would be so small that it would hardly be worth troubling about. Of course, there is this about it, the water power branch has responsibility for 253 feet of fall in the river, and we feel, apart altogether from the fact that domestic water supply must take precedence over hydroelectric use, that the effect would be so small that it is negligible. Therefore, we are not opposed at all to the city's water supply scheme.

Q. Where Lake of the Woods goes over into what is really a lake, although they call it Winnipeg River, it goes over at an average fall or head of 17 or 18 feet to 21 or 22 feet?—A. Yes.

Q. According to the height of the water?—A. That is, the head available for power at the outlet of the lake varies from 18 to 21 feet.

Q. We have been talking all the time about the effect of our abstracting 158 second-feet from the falls at Kenora and Keewatin and Norman Dam. But if we take the water, 158 second-feet, we will take it to Winnipeg, and the discharge from our sewers, where most of it would go, will not go back into the Winnipeg River, it will go into our Red River?—A. Yes.

Q. And what you mean is that there are 253 feet of available falls that can be concentrated by flumes and made available for water-power purposes, all of which will suffer the loss of our 158 feet, will they not?—A. What little loss it would be.

Q. And, notwithstanding that, speaking on behalf of your department, the water-power branch of the department of the interior, you think it is not a matter to be considered adversely?—A. No; absolutely not.

Mr. CAMPBELL. That is all.

By Mr. POWELL:

Q. It appears to me we are not crystallizing this thing, Mr. Chalies, and I will ask you just a few general questions. If we can get at the real kernel of this thing, I would like to get at it. It seems that the minimum product of all the gathering ground, which you might call the Lake of the Woods system, is 4,500 feet or under. Now, hold that in your mind. You understand me, do you?—A. Yes.

Q. The ratio existing between the Shoal Lake gathering ground and the total gathering ground of the Lake of the Woods system is as 1 to 72. Do you understand me?—A. That is, as 400 to 500 is to 156?

Q. No; as three hundred and odd square miles is to 26,000 square miles.—A. Yes.

Q. The ratio of the gathering ground is as 1 is to 72. The ratio of the product, if we take the same ratio with respect to the total water product, would be for Shoal Lake what amount of second-feet; that is, taking the minimum flow?—A. Would you ask that again?

Q. If the ratio existing between the gathering ground of Shoal Lake and the total gathering ground of the Lake of the Woods system is as 1 is to 72, and the total product of the Lake of the Woods gathering ground is, in the minimum, 4,500 second-feet, what would be the product of the Shoal Lake gathering ground on the same ratio? It would be about 60, would it not?—A. Yes.

Mr. CAMPBELL. Sixty-two and one-half, exactly.

By Mr. POWELL:

Q. I want to get this thing down into a nutshell, if we can. If, then, the minimum product of water for the Shoal Lake gathering ground is 60, what is going to be the result if you take 160 second-feet away from it? You have to borrow from where?—A. You are anticipating the worst possible condition.

Q. Do not say anything about conditions. I simply want to get the result down of what I am stating. Don't bother your brain with conditions; you give us the answer to my question. Working out that ratio on the basis of 4,500 second-feet as a minimum for the total system, the product of Shoal Lake would be about what? It would be 60 second-feet, would it not?—A. Yes.

Q. Now, I put you this question. If the Lake of the Woods is going to draw 160 second-feet from Shoal Lake, where is the balance coming from?

Mr. MAGRATH. That 60 is the minimum from Shoal Lake.

By Mr. POWELL:

Q. Certainly. The balance comes from where, then? How are you going to supplement the waters of Shoal Lake?—A. From Lake of the Woods.

Q. That follows, does it not, that the imes of the minimum production there must be a very large draft on the Lake of the Woods, must there not?—A. Yes.

Q. Do not bother yourself with assumptions. I am putting that case, that under those circumstances theremust be a large draft on the Lake of the Woods system. Do not worry whether my hypothesis is too large or too small; just get yourself down to the mathematical deduction.—A. Yes.

Q. The question respecting my hypothesis is whether I am putting too large a draft on the waters of Shoal Lake for the city of Winnipeg,

whether it would be 160 second-feet or not. That would be a debatable ground, would it not?—A. Yes.

Mr. POWELL. All right.

By Mr. MCLENNAN:

Q. Do you agree with what was stated by Mr. Meyer yesterday, that this question bears a relation to the regulating of the levels of the Lake of the Woods?—A. Yes.

Q. A close relation, does it not?—A. Yes.

Mr. MCLENNAN. That is all.

TESTIMONY OF LIEUT. COL. C. L. POTTER.

Lieut. Col. C. L. POTTER, produced as a witness on behalf of the applicant, having been duly sworn by the chairman, was examined, and testified as follows:

By Mr. CAMPBELL:

Q. Colonel, you are in charge of the military district, with headquarters at St. Paul, Minn.?—A. The engineer district.

Q. Your Government engineering force is under the Secretary of War?—A. It is.

Q. Have you looked into the question of our Winnipeg application for Shoal Lake?—A. Somewhat; not based on personal knowledge, but on figures and reports.

Q. On reports made to you in your official capacity?—A. Made to me and dug out of the Government records.

Q. Would you tell the commission your results?—A. The interest of the War Department on the Lake of the Woods is primarily one of the level of the lake. We have two harbors under improvement on the Lake of the Woods, and one about to become under improvement ou the lower part of Rainey Lake, at Baudette. The level on the Lake of the Woods, of course, will be directly affected; that up the Rainey River a distance will be partially affected. The improvement in all cases is a matter of dredging, and to get an 8-foot depth to which we are working in general, with some little modification in different places, the lower the level of the lake the deeper we will have to dredge, and when it comes into feet it makes considerable difference in the cost of our work. But as Winnipeg is building 84¾ miles of a concrete aqueduct, which is not built to stand a full flow, their project is practically limited for many years to this possible draft of 85,000,000 gallons per day. The cost of that aqueduct is more than eight millions, out of the thirteen millions they propose to expend. Therefore it is beyond reason to look for anything more to be taken out of the Lake of the Woods in many years than the 85,000,000 gallons per day, and it is presumed that they would not be allowed to replace that by a larger conduit, or build another parallel to it, without again coming before this commission, or some similar body which at that time will handle the situation. Therefore I am basing my figures only on what they propose to do now.

The 85,000,000 imperial gallons per day I figure will amount to a flow of one hundred and fifty-seven and a fraction feet per second. That draft on the Lake of the Woods will amount to 0.004 of an inch per day, or nearly an inch and a half in a year, provided there was no supply to the lake any more than enough to overcome evaporation.

This for a year's total inch and a half might be figured in its effect on our harbor improvements in this way, that the total cost of lowering the Lake of the Woods 1 foot at each of our harbors is $9,600, and the lowering 1½ inches, figured on that basis, would amount to about $1,200, which is so small compared with the amount that Winnipeg proposes to expend that I can see no ground for an objection from the War Department.

By the CHAIRMAN:

Q. You mean, Colonel, from the United States?—A. The United States, yes, from the navigation standpoint. The land interests, I believe, have an interest in the level of the Lake of the Woods, but I am not touching on that at all. The fact that this 157 second-feet would lower the Lake of the Woods 1¾ inches during the year means practically nothing. As I have said, the lowering per day is 0.004 of an inch. A slight shower the next day anywhere in the valley would restore that to the lake. It would take very little to put it back. I do not imagine that at any time during the year the effect on the level of the Lake of the Woods, due to the removal of 157 second-feet, could be measured.

As to the supply to Shoal Lake, I took some general figures. The United States Weather Bureau has taken observations in Minnesota for a great many years. The mean contour, as near as our observations get to Shoal Lake—which is not far—is about 22 inches rainfall, the average for a large number of years. The Signal Corps of the United States Army many years ago, when our Weather Bureau was under the Signal Corps of the Army, made calculations of evaporation throughout the United States, and the line of 20 inches evaporation would about pass through Shoal Lake, so over the surface of Shoal Lake you can count, probably, on two inches increase due to the rainfall directly on the lake, there being 22 inches of rainfall and 20 inches evaporation.

This supply to Winnipeg would reduce Shoal Lake, if Shoal Lake were separated from the Lake of the Woods, as I figure, 19¼ inches in a year. I have heard somebody say 17. My figures show 19¼. Two inches excess over evaporation on the lake would leave 17¼ inches to be made up from the land tributary to Shoal Lake. The land tributary to Shoal Lake is 3.3 times as much as the water of Shoal Lake. Therefore, if an inch of run-off occurred over the land area, it would raise the lake 3 inches. Based on that, 5.2 inches of run-off over the watershed would make up enough for Winnipeg's supply. The normal rainfall being 22 inches, it would require a run-off of nearly 25 per cent, which is a very large run-off, much more than we get in the headwaters of the Upper Mississippi, and I think at the headwaters of the Upper Mississippi we get more than they would get in the kind of territory they are dealing with. So Shoal Lake, in itself, would not produce the water necessary to supply Winnipeg, but would have to draw some from the Lake of the Woods.

By Mr. CAMPBELL:

Q. Could you indicate generally what proportion that might be, Colonel?—A. It would take a 25 per cent run-off to give them all of the water to Shoal Lake which is needed, and I would not want to figure the run-off in that section at much greater than half of that. Therefore, out of the 17¼ inches needed for Winnipeg, over what

Shoal Lake gets there from rainfall, nearly 9 inches over the area of Shoal Lake would have to come from the Lake of the Woods. The rainfall year after year, even in the State of Minnesota, can not be determined except by actual observations. For instance, in the Upper Minnesota River I find less than 5 per cent, and right across, in the headwaters of the Mississippi River, we get an average of 20 per cent.

Q. A few miles apart?—A. A few miles apart. One is a farming territory, and another is an Indian reservation, which has never been opened up, and the soil has never been turned up to consume the water.

Q. In the farming section there is more evaporation?—A. More evaporation from the soil.

Q. You are aware that in this territory, for many miles away from our watershed, there is no farming territory?—A. I am aware of that. But my acquantance with the Lake of the Woods is only on the south shore, and the whole country I have seen has many small lakes—swamps—which come under the subject of evaporation, and can not give more than the 2 inches which I allow the lake, and, on the whole, I would assume that it would not be safe to consider the run-off more than 12½ per cent.

Mr. CAMPBELL. That is all.

By Mr. MCLENNAN:

Q. The Minnesota side of the Lake of the Woods, I believe, is quite interested in maintaining, as near as possible, a uniform level of the lake?—A. The War Department of the United States Government is very much interested in that. More in deciding and holding a particular level than in fixing any particular level. We want to know what we are going to have in order to plan our harbor improvements.

Q. High water levels, I believe, are injurious at that end of the lake?—A. Not from our standpoint, but from the farmer's standpoint I am now speaking. I am a representative of the War Department only. But what you suggest is my information that I get talking with the people.

Q. The making of the Lake of the Woods a reservoir for holding the water would not be consistent with maintaining anything like a uniform water level on the lake, would it?—A. It would not.

Q. So that would it be your idea that the tributary waters, and the adjoining waters, should be depended upon for conservation and storage purposes, with a view to maintaining a fairly uniform level on the Lake of the Woods?—A. If the power is to be utilized at the mouth of the lake, yes. Five thousand seven hundred feet has been given here as the amount that has been utilized, or may be utilized when complete development occurs at the outlet of the lake. That would lower the lake per day only fourteen-hundredths of an inch. It would take it a week to lower it an inch, and if Shoal Lake were to empty into the Lake of the Woods to fill up that draft down, provided that whole draft down occurred, and there was nothing coming in to help that fourteen-hundreths of an inch that is going out, there would only have to be a current through what is known as Ash Rapids of a foot a second, or about that; that is, with the dimensions of the channel as given to me by Mr. Meyer. So I can not see

that there ever would be any condition wherein there would be any material difference of level between Shoal Lake and the Lake of the Woods.

By Mr. CAMPBELL:

Q. Just as quick as one fell the slightest degree below the other the water would turn?—A. The water would turn. The only thing that could make any difference would be a sudden shower, with a quick run-off, located primarily in Shoal Lake Basin.

Q. In the one as against the other?—A. Yes. It would take it a short time then to empty itself into the Lake of the Woods.

By Mr. POWELL:

Q. In other words, from the data you have at your command, the only movement between the waters is one of equilization of height?—A. Yes, that is all.

Q. It may be inward sometimes, and outward sometimes?—A. Yes.

Q. And sometimes quiescent?—A. Very seldom to any extent inward under present conditions, because a general rainfall would run off the short distance of the watershed of Shoal Lake much quicker than it would the Lake of the Woods, and any local rainfall on the waters of the Lake of the Woods would raise them very slowly. So the only condition that I can see where there would be any great current would be one outward.

Q. In other words, the water would have farther to travel, and it would be more quickly responsive to Shoal Lake than to Lake of the Woods?—A. Certainly.

(Thereupon, at 12.45 o'clock p. m., a recess was taken until 2 o'clock p. m.)

AFTERNOON SESSION.

(The commission reconvened, at the conclusion of recess, at 2 o'clock p. m.)

TESTIMONY OF MR. WILLIAM J. STEWART.

Mr. WILLIAM J. STEWART, produced as a witness on behalf of the applicant, having been duly sworn by the chairman, was examined, and testified as follows:

By Mr. CAMPBELL:

Q. Mr. Stewart, you are the chief hydrographer of the water-power branch?—A. Chief hydrographer for Canada. I am not attached to that branch, but to a separate department altogether.

Q. And I believe also that you are an International Joint Commissioner under the old waterways treaty?—A. International Waterways Commission.

Q. Your functions have not been completed in delimiting the international boundary through the larger lakes and rivers?—A. For the Great Lakes.

Q. You have heard the figures given as to what power taking a maximum of 85,000,000 gallons per diem to Winnipeg would make in second-feet, one hundred and fifty-seven and some fraction?—A. I have heard them, yes, and I have verified them.

Q. That is correct?—A. Yes.

Q. Have you verified also the calculation that if water from the surface of the Lake of the Woods could be given to us for ourselves, that it would only make 1.42 inches for the whole year's supply?—A. I verified those figures, too, Mr. Campbell. The only thing about those figures is that that applies, as I think Mr. Johnston said, to the fact if there was nothing coming in and nothing going out. In years of plenty, when the supply is a little bit large, that amount would not show, would not count at all, because it would come from the surplus that would otherwise be wasted, and the large effect of that reduction would come in the winter months, when it is immaterial, and in years when the supply was sufficient nothing would be felt from that amount of water going out.

Q. And when the supply was sufficient, during the summer, then the conservation of that amount of water for our Winnipeg use would be reduced to what we would need when the low season and the low supply began in the year, usually late in the autumn?—A. Well, no; there would be a surplus going away, and there would be less waste, that is all. Your supply would come from the west. When just the average of quantity was being used, then it has a quantity coming away from the power plants.

Q. But only at those times?—A. Only at those times, yes.

Q. So that you would agree with Col. Potter that the difference could not really be measured?—A. For any one year. If we get a few years of small supply, that is to say, that there is no waste at all, the amount may be cumulative; but otherwise it will not be. As long as there is any waste in any one year then that effect is not felt.

Q. Have you, from your consultation with the records, found more than two years together, two consecutive years, in which there was that small supply without any waste to be accounted for?—A. That I could not say. I have not seen enough records. So far, up to the present, of course, there has always been so much waste at Kenora, or at least at the dams, at the outlets. Of course, when ideal conditions obtain a little later on, I expect there will be no such waste as there is now at the Norman Dam. That will be stopped up, and there will be no leakage.

Q. That is, if there be users for that same water?—A. I do not mean that for a moment. I think every drop of it will be used.

Q. In the early future, even if the Backus interests do not develop their power, probably Kenora and the Lake of the Woods and Keewatin people would make use of the water?—A. I have no doubt in the world that all the water there will be used as soon as this question before the commission is settled, as to what the level is to be.

Q. I suppose it will be at that time, the way hydroelectric development is going on among all the people who have the advantage of falling water. Is there anything else you wish to offer?—A. In connection with the supply, this morning Col. Potter made some statements as regards the rainfall and the evaporation. I would look at that in a different light, and my figures will corroborate the colonel's. He figured out that there was an annual or a mean rainfall of about 22 inches, and about 20 inches of evaporation, leaving a surplus of 2 inches.

Q. On the whole surface?—A. On the whole surface. Then, in dealing with the land surrounding the lake, he figured this morning that about one-eighth of the 22 inches would be run-off. In the case

of Shoal Lake, where the area of the land surrounding the lake and draining into the lake is about twice the area of the lake, this would give one-eighth of 22 inches, about 3 inches, and then, if double the area, you would get 6 inches, so that the lake would receive 6 inches from the land, and the 2 inches it received as surplus would make, as I figure out, according to his figures, about 8 inches. Taking it the other way, the mean discharge from Lake of the Woods is about 10,000 feet. We may, take that as the supply to the lake, and the area of the lake surface is about 1,500 square miles. Dividing the 10,000 by the 1,500 you will get about 6⅔ inches per square mile of water surface as the quantity of water that comes from the supply. If you give Shoal Lake its proportion, that is to say, one-fourteenth of that, you will get about the 7½ inches as the supply that Shoal Lake is entitled to; that is, that its drainage basin gives. For a supply of 85,000,000 gallons per day Shoal Lake requires about, I think Col. Potter makes out, 19 inches. We will take his figures as being pretty nearly right. Winnipeg will have to get, under average conditions, 19 less 7½, which will be 11½ inches, some place, and the only place you can get it will be from Lake of the Woods, so that in that arrangement Winnipeg will have to draw water most of the time directly from a boundary water. There are some months in the year when she will not have to do it, when she will get enough from her rainfall; but on the average she will require it,

Q. Our figures are 17 inches. I do not think 19 is justified on 107 square miles.

Mr. MACINNES. Less than 2 inches of rainfall, the way Col. Potter puts it.

Mr. CAMPBELL. I think eighty-five millions a day will make 17 inches on a surface of 107 square miles. We can compute that later. That is just a sum in arithmetic. I do not think we need to take evidence on it.

Mr. POWELL. Still, it would save us a lot of calculation, if your expert can figure it. But let it go.

The WITNESS. I have an extract here from a report of the geological survey of Canada for the year 1885, in which one of the geologists of the survey then, Mr. Lawson, states:

> Inclosed within the limits of the accompanying sheet is Shoal Lake, an extensive body of water, on a slightly higher level than the Lake of the Woods, and separated from it by the Western Peninsula. It drains directly into Ptarmigan Bay, without the intervention of a river, by Ash Rapids, the name given to two small chutes, half a mile apart, with a little lake between. The difference of level between the two lakes varies with the abundance of water in different seasons. When the water is high, the lower rapid becomes obliterated and it is possible to paddle over what at low water is a distinct fall of several feet. The level of Shoal Lake is much more constant than that of the Lake of the Woods, which has a rise and fall through a range of 10 feet.

I offer that as part of the evidence that Shoal Lake is not a boundary water. The year 1885, I think, would be previous to any works being constructed at the outlet.

By the CHAIRMAN:

Q. Mr. Stewart, if I understand you and Col. Potter correctly, the water of Shoal Lake will not be sufficient to accommodate the needs of the city of Winnipeg, and in order to meet their needs it will be necessary for them to draw water from the Lake of the Woods?—A. Yes, Mr. Chairman; the records point that way.

Q. So that it would be necessary, in that case, for the application to cover not only the diversion of water from Shoal Lake, but also the diversion of waters from the Lake of the Woods as well, in order to meet the requirements of the city when they reach the maximum?—A. When they are drawing from Shoal Lake, it will have to come in through Lake of the Woods, to keep up the supply.

By Mr. McLennan:

Q. In the event of adequate conservation and storage, and the full utilization of the waters for power purposes, then this inch and a half that is referred to approximately would be fully felt?—A. If you could have complete regulation; that is to say, if you could use the average water all the time, and if you could hold it without any waste, you would use it. But that is a condition I do not think engineers can quite make fit exactly, so that at times there will be waste from which the Winnipeg supply can be drawn without hurting the other. But, as long as there is no waste, then Winnipeg is taking it from the surface of the lake.

Q. Is that waste that you refer to not likely to take place largely in any case?—A. I do not quite catch your question.

Q. Is not that waste you refer to, that waste that is bound to take place, not likely to occur in any case, whether Winnipeg is taking the water or not?—A. Not when the power companies get proper dams into the outlets. In seasons of small supply there will be no waste. It is only in seasons of large supply that there will be waste.

Q. The powers at Kenora are not all developed yet.—A. I quite understand that all that water that is being lost at Norman Dam will some day be used to develop power.

By Mr. Turner:

Q. Can you translate this 156 cubic feet, which will be drawn off daily, into horsepower at the dams at Kenora, and tell us how many horsepower it would deprive them of?—A. That all depends on the fall. It would be about 260 horsepower with a 17 or 18 foot head.

By Mr. Campbell:

Q. Yes, a little over 18 feet.—A. That quantity of water would be lost on all the power plants down the river. It diminishes the flow by that amount.

Q. That loss will be divided, necessarily, at the outlet?—A. It will be divided at the outlet. Each company would lose a certain amount.

Q. But from there down each power producer will lose the whole of it?—A. Each plant will lose.

Q. And each plant will lose it all, and some of them will lose it based on a very high head of water; so that they will lose many more horsepower than will be lost altogether at Kenora.

By Mr. Turner:

Q. Would this diversion at all prevent the present installations from developing all the horsepower of which they are capable?—A. Not at all. There is far more waste than that.

By Mr. McLENNAN:

Q. Would that apply with the Norman power fully developed?—A. You can easily stop that waste at the Norman Dam, and that would more than balance what Winnipeg was taking.

Q. That likely would be stopped just as soon as the Norman power were developed?—A. I do not see why they should let that water go to waste.

By Mr. TURNER:

Q. Then, if there were no waste, they still would have enough water, without this water that Winnipeg wants, to utilize all their present facilities?—A. I understand the power plants at the present date can not use all the water that goes down there. But they will have to allow that amount for future deveolpments.

By the CHAIRMAN:

Q. Mr. Stewart, it may not be very material to this issue, but for my own information I would like to have the record show, if possible, the commercial value of the industrial plants that now exist at Kenora and below in the Winnipeg River, which are now supplied by the waters from the Lake of the Woods, and the possible commercial value of future development, the aggregate development or use of all the water of the Lake of the Woods and the Winnipeg River.—A. I think that would come strictly within the scope of the work of the water-power branch.

The CHAIRMAN. It would be of some interest to me, at least, as a member of the commission, to know what the magnitude of the interests is that are involved in the use of this water from the Lake of the Woods, both at Kenora and down the Winnipeg.

Mr. CHALIES. That could be very easily arrived at, Mr. Chairman, by considering the maximum use to which that river could be put for power purposes. Our surveys show that on the Winnipeg River, in Manitoba, the total possible power output would be about 409,000 horsepower.

The CHAIRMAN. In the Winnipeg River?

Mr. CHALIES. Yes; in Manitoba. There is another power site of economic development between the boundary of Manitoba and the outlet of the Lake of the Woods, which I think would add another 50,000 horsepower to that amount. Then, in addition to that 459,000 horsepower there would be the total power capacity on the lake. All of that power could be capitalized; that is, powers worth, roughly, so much per year per horsepower. Is that what you were after?

The CHAIRMAN. That is what I wanted. What is the power at the outlet there at Kenora, measured in horsepower? You have given us 459,000 horsepower in the Winnipeg River.

Mr. CHALIES. Roughly speaking.

The CHAIRMAN. Does that include Kenora?

Mr. CHALIES. No; it does not. Do you know the total, Mr. McLennan?

Mr. McLENNAN. It is estimated at 40,000.

Mr. CHALIES. At Kenora?

Mr. McLENNAN. Yes; that is, including the Keewatin.

The CHAIRMAN. Forty thousand?

Mr. McLENNAN. Yes.

Mr. CHALIES. I would consider that rather a large estimate.

Mr. CAMPBELL. Those figures would please me if I had them in evidence. I think that is too high.

Mr. MCLENNAN. I think they are high; but that is the ordinary estimate.

Mr. CAMPBELL. I do not think we need that much—at least, I hope not. But I think you are putting that against yourself, Mr. McLennan.

Mr. MCLENNAN. It may be. But I am telling you what I understand it to be.

Mr. CAMPBELL. That does not agree with the records.

The CHAIRMAN. I wanted the aggregate measured in horsepower of the interests we are dealing with here.

Mr. CHALIES. In a rough way, the power possibilities at the outlet of the lake would be about 15,000 horsepower, considering the 18-foot head, and a uniform flow throughout the year of about 10,000 second-feet. So that the 459,000 and the 15,000 would be about 474,000 horsepower, 24-hour dependable horsepower, that is affected by the lake.

The CHAIRMAN. What is the approximate value of this power per horsepower?

Mr. CHALIES. It could be developed at a capital cost of $100 per horsepower.

By Mr. POWELL:

Q. At that distance from the point of diversion it would be about $10 per horsepower?—A. That does not include transmission cost.

Mr. JOHNSTON. No; that is practically the power on the low-tension switchboard. That is according to the estimates we have gotten out for the plants lower down the river.

The CHAIRMAN. But the value of the horsepower would be about $10 a year?

Mr. CHALIES. It would be more than that, I think.

The CHAIRMAN. I see by the testimony the commission took at Kenora a year ago last September that the city of Kenora is furnishing horsepower to manufacturing concerns in Kenora at $10 per annum.

Mr. MCLENNAN. That was in the nature of a bonus to a milling concern.

The CHAIRMAN. So that it would be more than that?

Mr. MCLENNAN. It would be more than that, yes.

Mr. CAMPBELL. Your own domestic supply costs more than that?

Mr. MCLENNAN. It costs us more than that.

The CHAIRMAN. It does?

Mr. MCLENNAN. Yes.

Mr. TURNER. Of course, the great cost of utilizing it would minimize the value of the power?

Mr. CAMPBELL. Yes.

Mr. TURNER. Have you any means of determining what the commercial value of that power is, considered in the light of your having to sell a thousand horsepower to utilize?

Mr. CHALIES. We consider that the power there is all economical. It is commercial power. It is just simply a question of market. It can undoubtedly compete favorably with power from any other source.

Mr. POWELL. What would be the value per horsepower as indicated at the power house?

Mr. CHALIES. If you consider that $10 a horsepower to be a very small price to get for horsepower, the value of the water powers would be four and three-quarter million dollars per year.

Mr. POWELL. Let us see, Mr. Chalies; you are overlooking one very important element. Generating 1,000 horsepower, for instance, would enable you to sell nearly 2,000 horsepower on account of the intermittent use during daily life.

Mr. CHALIES. Quite so; not for 24-hour horsepower.

Mr. POWELL. That is the way they sell it, for 24 hours. But it may only be used 10, and you may be able to sell 2,000 horsepower when you are generating only 1, just as people sleep in the same bed at the hotel night after night and are charged for the room and bed.

Mr. MAGRATH. Mr. Chalies, that 450,000 horsepower that you speak of is not alone produced from waters of the Lake of the Woods, is it?

Mr. CHALIES. Oh, no.

Mr. MAGRATH. It is from other sources, as well as the waters that come out of the Lake of the Woods?

Mr. CHALIES. Yes.

The CHAIRMAN. We are dealing only with the Lake of the Woods, and what I wanted to get in the record for my own information was the magnitude of the interests we have to deal with. How much of this would be contributed by the English River?

Mr. CHALIES. The English River, I understand, would contribute a little less than half of the flow that is necessary to realize this development. But, at the same time, the development of all that power depends primarily on uniform flowage out of the Lake of the Woods. So that, considering all this power, its only feasible development, commercially or economically, is dependent on the fact of there being a fairly uniform flowage out of the Lake of the Woods, so that the complete realization of that development depends on the Lake of the Woods.

The CHAIRMAN. It is all dependent on a reasonably uniform flowage from the Lake of the Woods?

Mr. CHALIES. Yes; quite so.

The CHAIRMAN. Is there anything further.

Mr. CAMPBELL. Nothing that I have.

STATEMENT OF MR. JAMES H. FUERTES.

Mr. JAMES H. FUERTES, produced as a witness on behalf of the applicant, having been duly sworn by the chairman, was examined, and testified as follows:

By Mr. CAMPBELL:

Q. You are a civil and sanitary engineer, Mr. Fuertes?—A. I am; yes, sir.

Q. How long have you been practicing?—A. I am a graduate of the College of Civil Engineering of Cornell University in the class of 1883, and I have been in practice ever since—30 years.

Q. You reside where?—A. My residence is in Brooklyn; my office is in New York City.

Q. You are one of the three consulting engineers for the Greater Winnipeg water district?—A. I am one of the commission appointed to make that report. The city has not three consulting engineers on construction so far as I understand; there is only one.

Q. And that is——A. That is myself.

Q. You were one of the three consulting engineers to bring in a report, and the city has retained you as consulting engineer of construction?—A. Yes.

Q. Who were the other two who were with you?—A. On the report the other two were Mr. Rudolph Hering, of New York, and Frederic P. Stearns, of Boston.

Q. Both of them at the top of their profession?—A. Both men very well identified with water-supply works.

Q. Will you name one or two of the installations you have made?

Mr. POWELL. No one is attacking his qualifications.

Mr. CASGRAIN. We will take that for granted.

The WITNESS. I thank you.

By Mr. CAMPBELL:

Q. I will show you a printed copy of a report. You and Mr. Hering and Mr. Stearns joined in making that report?—A. (After examination.) Yes. This is the report dated August 20, 1913.

Mr. POWELL. You are putting it in evidence, Mr. Campbell?

Mr. CAMPBELL. Yes.

By Mr. CAMPBELL:

Q. You had previously acted for the city of Winnipeg?—A. In a former engagement, in 1907, I was one of the engineers who reported on the Winnipeg water supply. The other members of the board were Mr. J. E. Schwitzer, who was assistant chief engineer, I believe, at that time, of the Canadian Pacific Railway; Mr. R. S. Lea, consulting engineer, of Montreal; and Mr. George C. Whipple, of New York, consulting engineer.

Q. Of Hazen & Whipple?—A. Yes.

Q. In that report of seven years ago you found in favor of taking the city of Winnipeg's water supply from the Winnipeg River below Lake of the Woods?—A. Yes; we did.

Q. Tell me, briefly, the considerations that have led you to report in favor of Shoal Lake in the report of six years subsequent to that first one.—A. The first report, made in 1907, was made when the population of Winnipeg and of the district itself, I believe, was only about half what it is at the present time; and at that time also the city of Winnipeg was very strongly in need of a cheap power, and in considering the merits or necessity of the two propositions, either the water supply or the power, preference was given to the power at the start, and it was felt at that time that between a new water supply which was very costly in construction, as compared with another one costing less but about the same to operate, the preference was given to the one which cost the less to construct, on the basis that either would give a satisfactory water. That report was received, and no action was taken with regard to carrying out the recommendations. The matter lay dormant until this last year, when this new commission was appointed. We felt, on the second commission, not bound at all in any way by the recommendations made in the first report, further than to take into consideration everything that had been taken into consideration before, and to find, in view of all the conditions existing when the second report was made, as to what we thought was the best policy for the city to pursue. In the first report the annual cost of operation of the Shoal Lake proposition was, as I remember, a little

less than from the Winnipeg River, the difference was not great; but the Winnipeg River supply cost a great deal less to build, and could have been built in a much shorter time, as we then estimated it. We therefore at that time reported in favor of the Winnipeg River. On this second report the population having greatly increased, the power plant having been installed and having commenced to make money, and things being more favorable in every respect, and the city having found a way of getting the water from Shoal Lake by a more satisfactory method than appeared in the first instance, because at first the surveys were not very complete, we found in favor of Shoal Lake as a supply.

Q. There is a little river running out into Indian Bay where the proposed intake will be—Falcon River, I think. Will you explain to the commission how Falcon River shows itself in the two reports?—A. When the first report was made we had two suggested methods of getting the water from Lake of the Woods. One was to take it out of Indian Bay, and the other was to extend the intake out to the main lake. In the plan in which the intake was to have been in Indian Bay, it was contemplated that decolorization at least would be necessary, because of the high color of the water in the end of the bay, due to the discharge into it of the drainage from the swamps tributary to the Falcon River.

The other plan, of going out to the main lake, would have gotten rid of the trouble from color; but the line was longer, and the construction cost, of course, greater. In taking the question up the second time it seemed as though if the dirty water of Falcon River could be gotten rid of, we could use Indian Bay as the intake point, because the water was sufficiently deep, and a little study showed that it was possible to do that by putting a dike across the end of Indian Bay, cutting a little channel through from Indian Bay to Snowshoe Bay, and turning all that Falcon River water over into Snowshoe Bay. That would leave us the clean water from the Lake of the Woods coming in through the narrows to Indian Bay, as our main source of supply, and we would get rid of the trouble from color. The diversion of the black water from the Falcon River into Snowshoe Bay, we believed, would effectually get rid of that trouble, as it would take a number of years for the flow of the river to displace the water of Snowshoe Bay and get around into Indian Bay.

Q. And by that time would any effect have been had upon even that colored water?—A. Oh, yes. In several years time that color will bleach out from exposure to the sun.

Q. Although the colorization of the water coming down Falcon River was a factor with you seven years ago, there was, after all, nothing in the coloring that was inimical to health?—A. Oh, no; it is just simply an appearance.

Q. And might produce functional trouble with people who did not like unpleasant looking water. Will the building of that dike and the diversion of the Falcon River water, without allowing it to come into Indian Bay, but throwing it into Snowshoe Bay, be expensive?—A. No; that is very cheap. I think our estimate is about $130,000. It is simply a little dirt dike across the end of the bay, and a channel cut through from Indian Bay into Snowshoe Bay.

Q. The channel will be short?—A. Yes; and the ground is just about at the lake level. I went farther last June, but could not get through on account of so much shallow water.

Q. When was that suggestion of that cut-off first made?—A. It was made in June, 1913.

Q. In the 1907 report did you compare the natural quality of the two waters; that is, without sanitary treatment, without settling or filtration?

Mr. POWELL. Or chlorination?

By Mr. CAMPBELL:

Q. Yes, or chlorination. What was the comparison in 1907 as between the two waters, of Shoal Lake and Winnipeg River, in their natural state, without treatment?—A. We found at that time, and so reported, that the Shoal Lake water was the best natural water of all the waters we examined.

Q. And so reported in 1907?—A. In 1907.

Q. In the 1907 report you were faced, however, owing to the idea of this cut-off from Falcon River not having occurred to you, with the necessity of treating Shoal Lake water at that time, as well as treating Winnipeg River water, so that the treatment cost came into both plans?—A. We had one plan for taking water from Shoal Lake which did not contemplate treatment. That was the one of the extended intake out to the main lake. But the water that was to have gone to Indian Bay, which was the cheapest in construction cost, did include decolorization.

Q. The element of the greatly increased cost of extending the intake pipe out into the main lake had something to do with your decision?—A. Yes.

Q. About how much time have you spent on the matter, Mr. Fuertes? I do not ask for specific days, but did you spend enough time to satisfy yourself as to the results to be recommended?—A. Yes, as to general results. Of course, our investigations were not intended to be made for detailed plans of construction. They were to determine general principles amd policies.

Q. The local staff, under your supervision and consultation, is going on with that work now?—A. Yes. On my first visit up there we went out on the Lake of the Woods, were out there several days, and I was out there again this spring several days.

Q. I want to ask you one question that may not be directly apposite in one way; perhaps it is in another. Will you tell the commission what Winnipeg's existing water supply is?—A. Winnipeg's water supply at the present time, and for many years past, has been derived from ground water, from wells dug down into the surface, into limestone rock.

Q. Have you examined the sources of supply there, to ascertain at to whether they will likely be sufficient for a large increase?—A. We made a very careful study of that whole situation, knowing that a town which is accustomed to a perfectly clear, bright water is going to be hard to satisfy with anything else, and if we could have found a sufficient supply of good ground water we would not have hesitated to recommend it, even at a higher cost, because they are used to it. All the surface waters are high in chlorine, which cuts boilers, due to the salt deposits; and they are very high in lime. Up to the northwest of Winnipeg, north and northwest, the indications were that there was a much softer water, a much more satisfactory water, and we made some pretty careful studies of that, as well as we could, and

we came to the conclusion that the water was not there. We had to go somewhere else for water besides that ground-water development. At the same time we realized that it would be many years before a new supply of soft water could be brought to Winnipeg from any source, because the distances were so great. So we recommended that the city go ahead, as fast as it could, to increase its water supply, put down more wells, and erect new pumping stations, because otherwise the city would be in trouble very quickly. That policy has been pursued. When we went there they had four wells from which they were pumping. Now they have 11. Our prediction was that the quantity of water they could get from those wells in the district would not be materially increased by the number of wells they put down, owing to the fact that the water comes through channels and crevices in the rock, and that putting down one well would rob another well in that vicinity; and, in effect, that has been what has happened. At that time they were getting about seven millions a day, and now they are getting about eight, with 11 wells instead of 4.

In our 1913 report the same recommendation was made; not only that, but they should go ahead to Poplar Springs, away off to the northwest, and keep that up, because they are in sore distress for water, a city growing as fast as that, with a population of at least 175,000 depending on 8,000,000 gallons. That is not a very good outlook for insurance or for protection of any sort.

Q. About 46 gallons per capita?—A. About 46 gallons per capita.

Q. What is the usual demand from civic populations?—A. That is very variable. It depends on the nature of the town. I know of one city which uses only 30 gallons for domestic consumption, and 300 for manufacturing, and it is all metered. There is no standard. It depends on what is required for the city. Because a city uses 200 gallons per capita it does not mean it is all waste.

Q. However, what have you to say as to Winnipeg's consumption?—A. We believe that it ought to be about double what it is; and that when the new supply comes in, so that the pumps can keep up a sufficient pressure in the mains, there will be more water used than now, and more waste than there is now.

Q. Not deliberate waste?—A. Not deliberate waste, but waste because of greater pressure on fixtures. I should say 100 gallons was not a liberal estimate. I think it is fair, and probably ought to be more.

Q. Then, I have noticed in your report that is the way you seem to be treating it, 100 gallons for 850,000 people.—A. Yes.

Q. I have been turning those figures around and making 85 gallons for a million people.—A. We had the statement in the report that we considered that 85 would be a fair figure, but that owing to the fact that the pressures will be increased, and that the uses of water would increase, with better pressures, it would be safer to take 100 gallons; so that was the figure we used, 100 gallons per capita.

Q. It will take some time to make the detailed specifications for the men who have to go and do the work on the ground, I presume?—A. It will, indeed. The report that has been handed in, this 1913 report, of course, was made with the best information we could gather in the time available, and we laid down a scheme which we felt would not be upset by any conditions which might come, because we thought we were close enough to it. But there were possibilities of differences

when actual surveys were made between what we would find and what we had to work with. So the first thing that I did in connection with this work was to recommend the carrying of a set of precise levels right through from Winnipeg to Shoal Lake, to be sure we had the elevations we had figured on, because our elevation figures are so slight on that altitude work that a mistake of a few feet on the intake level might throw the water the wrong way. All that matter is still in the air, and I am not yet able to say what the elevation of the intake should be. That matter is still to be determined. We believe it is on the plans about where it ought to be.

Q. You feel sure that up to a consumption of thirty or forty million gallons per day you can get through with your gravity supply?—A. We have no doubt of that. After that it is possible we might have to put a booster pump in there to lift the water. That is a very small matter. It takes a very small amount of power to lift that a few feet.

Q. In constructing that line I see you propose the building of a cheap railway to carry supplies and materials, the cement and the steel that will be necessary, and the bridging, from Winnipeg eastward, or from a railway point a little east of Winnipeg.—A. That was recommended in the report. It is not yet definitely determined whether that will be done or not. It is a matter the administration board has to act upon, and the decision does not rest entirely with the engineers.

Q. What, then, can you say, briefly, as to the position of the city as to urgency of the matter?—A. The work stretches over from 85 to 90 miles of country which is almost inaccessible excepting in the winter, when it is frozen over. I imagine that fully 50 miles of it is muskeg, some of it, and a good deal of it, rather difficult to get through. That is what our records show. Our new lines may show some improvement, and whether or not the city will construct a railroad depends upon the policy that the district is going to adopt with respect to letting the contract. If they want to let the contract all to one contractor, find one big man to do the work, I do not think they would bother with the construction of a railroad, but would leave that to the contractor. On the other hand, if they want to admit smaller contractors, bidding on it in sections, million dollar bunches, or something like that, I do not see how they could very well carry on the work without having a railroad. It is inaccessible. It takes time to do that. We can not get started, hardly. The best progress we can make on construction work inside of a year, and we must know a number of things, particularly in regard to the elevation of the lake—Shoal Lake—within a reasonable time, else all of our plans for that Summit Cut work, which is 9 miles, will have to go over for another season, and we are very anxious to get started, because there is a million yards of dirt to move there in 9 miles, with 9 or 10 feet of swamp on top of it. That is going to be the slowest part of it. We can not do a thing on that until we know where our intake is to be.

Q. Mr. Meyer raised a point yesterday about the height of the bottom of that intake pipe. I think, without regard to that correction between the American datum and our datum, 1,052 was the sum of the two data you used, 728 plus 324?—A. Yes.

Q. Mr. Meyer thought that with that there might be a danger of the city not being able to get water over the ridge of land, and out of the lake, without an enormous expense, unless the commission—

and Providence—fixed a high stage of water which would give you the level. What have you to say as to what you think of that?—A. We fixed the elevation of 1,052, or 324 on our plans, with respect to the high-water level, and what we thought would probably be about the average level of that lake, and we put the bottom at 324, which is 11 feet below high water. Our aqueduct section there is 9 feet high. It runs a maximum capacity of about 8 feet depth. With the water surface drawn down 3¼ feet, or about 4 feet below high water, which would be 1,059, our aqueduct has a discharge capacity of about 100,000,000 gallons through that Summit Cut and 85,000,000 through the balance of the way. It was not felt that the water in the lake would stand at low-water level constantly. Of course it can not. It must be a great deal above that most of the time, and we felt with that elevation, 4 feet below high water, with a capacity of 85,000,000, it would be many years before the city would grow to that, and that when that time came, the installation of a very small booster pump would lift from the lake into the aqueduct the necessary quantity of water that might be required in excess of the amount going in at low water. At low water—that is, 1,057 elevation—the aqueduct will take down 50,000,000 a day, and our first pipe lay-out, from Transcona into Winnipeg, is only for 25,000,000 a day. When that capacity is exceeded, then the proposition is to put in another pumping station either at Transcona, to force the water through, or at the Red River, and take the water that comes by gravity there at Red River and pump it through the pipes on down. Our first plan is for 25,000,000. The 85,000,000 is looking as far ahead as we thought the city's money would stand for. We wanted to build for as much as we thought the city could stand. In works that are as expensive as these, with such long lines, that seemed to be the proper policy.

By Mr. MACINNES:

Q. What is the size of that pipe; 11 feet, is it not?—A. What pipe?

Q. The intake pipe.—A. There is no dimension given for an intake pipe. The aqueduct section, from the lake through the cut, there is 9 by 10, 9 feet high and 10 feet wide.

Mr. MACINNES. There is some suggestion of taking your datum of 1,052 and adding 11. That would make 1,063 in order to fill the pipe.

Mr. MEYER. That was high water; 1,052 was the bottom of the pipe, and 11 feet added to that gives 1,063 as high water.

Mr. MACINNES. What is the 11 feet?

Mr. MEYER. That is the distance that the bottom of the pipe was below the high-water mark, as stated in the report.

By Mr. CAMPBELL:

Q. At what figure could you get the best flow of water?—A. About 8 feet. That is, you could discharge your capacity with that.

Q. Was there anything more you wanted to say about that?—A. I think not.

Q. Did you say you thought the city was safe, no matter what datum was necessary?—A. I did not say it in that many words, but I do say so.

Mr. CAMPBELL. The Lake of the Woods reference commenced before the commission before we came in with our application. My

own opinion yesterday was that the city of Winnipeg, if it went on with our works, provided you gave us an order, must go on with the risk of whatever order you made in the Lake of the Woods reference, you having no reference to our necessities or right. We must take our chances. If we could not take them, then we delay going on with construction. It seems to me there is no alternative.

The CHAIRMAN. You understand, Mr. Campbell, that any reference or action of the commission is not in the form of an order nor in the form of a decision. We simply make a recommendation to the two Governments, and the two Governments must subsequently adopt or reject.

Mr. CAMPBELL. I wish to relieve the commission of having to consider us in that recommendation, and I have obtained telegraphic authority to give that undertaking as counsel.

Mr. POWELL. You had better put that telegram in. I think it is very essential that we should have that.

Mr. CAMPBELL. I will do so.

Mr. POWELL. That is, to consent to us making our report on the general question of the Lake of the Woods.

Mr. CAMPBELL. The telegram is at the hotel. It has been telephoned me.

The CHAIRMAN. You can get the telegram and have it inserted in the record.

Mr. CAMPBELL. I will do that.

By Mr. CAMPBELL:

Q. Mr. Fuertes, do you know of Prof. Slichter?—A. I have never met him; I know of him.

Q. He is a water-supply expert, and particularly on the geological side. I believe he is not an engineer of construction.—A. I understand so. My only knowledge of him is through his reports to the Geological Survey of the United States.

Q. You have read his report made to the city of Winnipeg, dated September 6, 1912?—A. Yes.

Q. It is not made to the city. It is made to Hon. Mr. Robson, the public utilities commissioner of the Province of Manitoba. It was at his instance. You have read the report?—A. I read the newspaper abstract of it. I have not seen the complete report.

Q. You know that he recommended Shoal Lake?—A. Yes.

Q. And did so largely on the ground of the natural quality of the water, as apart from treatment?—A. I believe so, yes.

Q. You agree generally with his finding?—A. As to the source, yes.

Q. I will put that in the record. It is in the report of our public utilities commission and one of its appendixes.

Mr. POWELL. Can you not indicate the portions that are material?

Mr. CAMPBELL. I will put in only at page 39.

Mr. CASGRAIN. What is your purpose in putting that in?

Mr. CAMPBELL. Merely to show choice of water. I thought we had two problems to present after the jurisdiction question, one that we needed that water, and, secondly, that there was enough water to spare.

Mr. CASGRAIN. As far as I am concerned, I am satisfied.

Mr. CAMPBELL. Prof. Charles S. Slichter's report, from pages 39 to 61, inclusive, of the report of the Manitoba public utilities commission.

Mr. CASGRAIN. Do you think it is necessary to your case to put that in?

Mr. CAMPBELL. Perhaps with what Mr. Fuertes has said, that he reported in favor of it, that will be enough.

Mr. MAGRATH. I think, in view of Winnipeg changing its attitude on this question, having at one time decided to take water from the Winnipeg River and having changed to Shoal Lake, perhaps for the sake of the record it is better to have the evidence.

Mr. POWELL. As to why they changed?

Mr. MAGRATH. Yes.

Mr. CAMPBELL. That was what was in my mind.

Mr. CASGRAIN. But has not Mr. Fuertes explained that?

Mr. CAMPBELL. He has brought in Prof. Slichter by his own evidence. I am quite satisfied. It will make a very bulky record.

Mr. CASGRAIN. Mr. Fuertes is not going to be contradicted, I am sure.

Mr. MCLENNAN. There is only this, I might state, that, of course, the source of their water supply is a principal feature of the question, as we regard it.

By Mr. POWELL:

Q. Mr. Fuertes, I am not acquainted with the locality. Where does the town of Kenora discharge its sewage, or how does it dispose of it?—A. I can not tell you. I do not know.

Mr. POWELL. Do you know, Mr. McLennan?

Mr. MCLENNAN. Into the lake. It is really at the outlet of the Winnipeg River.

Mr. POWELL. That is, virtually into the Winnipeg River?

Mr. MCLENNAN. Yes. I might state in that connection that we already have the plans of a sanitary expert, under the Ontario health act, for a complete disposal plant for our sewage.

Mr. POWELL. At present it would pollute the waters of their aqueduct to a certain extent?

Mr. MCLENNAN. At present?

Mr. POWELL. If the intake was below the Winnipeg River, because the most elaborate investigation we have made of boundary waters this year all goes to show that this pollution extends 15 miles out into Lake Ontario, in the still waters of the lake.

Mr. MCLENNAN. This, of course, is a fact in our community, that that intake that is referred to as the Winnipeg River source would be upward of 100 miles below Kenora; and there is also this fact, that the Winnipeg River is, in reality, a chain of lakes, so that there is great distance from Kenora.

Mr. POWELL. It gives the bacilli time to die, although they are quite tenacious of life. About 30 days is the limit of longevity.

By Mr. MCLENNAN:

Q. Mr. Fuertes, you have referred to the 1907 report. Could you produce a copy of the report?—A. I have a copy here.

Q. I understand that in 1907 an adequate supply of good water was an important question with the city of Winnipeg?—A. It was.

Q. And that the city had appointed a commission of ten of its leading citizens, the mayor, controllers, and aldermen, to take up and deal with the question of procuring a permanent source of water supply?—A. That is right.

Q. And by that commission you and your associates who formed the board of consulting engineers were engaged?—A. That is true.

Q. I believe that one or two of the members of that commission did not agree to the report that was brought in. Do you know anything about that?—A. I never heard of any such thing. The report was signed by all of us.

Q. That is, by all of the engineers?—A. Yes.

Q. I am referring to the members of the commission.—A. I know nothing about that. I was not there after the report was sent in. I know nothing about it.

Q. The present mayor of Winnipeg was one member of that commission?—A. I believe he was, but I am not sure that he was.

Mr. CAMPBELL. Yes; he was.

The WITNESS (referring to report). Yes; he was.

By Mr. McLENNAN:

Q. At that time you investigated the situation very carefully, considering that it was a large investment?—A. We did; certainly.

Q. And, as you have told us, your report was in favor of Winnipeg River water as being the most desirable source of supply for the city of Winnipeg?—A. At that time; yes.

Q. At that time you considered the question of the growth of the city, and outlined it in the report, did you not? Perhaps this report may have to be put in.—A. We did.

Q. And did you not fully anticipate the growth, according to what you have shown in the report?—A. We thought that would represent about what the growth of the city would be; yes.

Q. And you did not fall short of it, did you?—A. I believe the prediction was somewhere near right.

Q. I think you predicted very accurately. So that in that respect there has been nothing new developed to alter the situation?—A. I do not know just what you mean.

Mr. CAMPBELL. Excepting that one was anticipation, and now it is realization. A man will spend much more money on the latter than he will on the former.

By Mr. McLENNAN:

Q. That is the fact, is it, that there is nothing in that respect to alter the situation?—A. I do not understand what you mean by "alter the situation." The growth of population has been about what we expected it would be.

Q. At that time you dealt with the several sources of supply, the Winnipeg River, Indian Bay, Shoal Lake, and the others?—A. Red River.

Q. You dealt with them all?—A. Yes.

Q. And you considered at that time that the water of Shoal Lake should also be treated, as well as that of Winnipeg River and any other sources?—A. No; I do not think that is an exact statement of the case. We considered that if taken from Indian Bay it would certainly have to be decolorized, and we believed that if taken from the Lake of the Woods there was a great deal of doubt as to whether it would require any purification at all, the only question being whether or not in the future growths might develop in that water which we did not know anything about. It would only be for the

growths of plants which caused odors and tastes, and that is still the opinion. On page 52 I find this reference:

The necessity of filtering the water from Indian Bay or Shoal Lake, particularly at first, may not be imperative, as it might be possible that the troubles with algæ growths, with color and turbidity, would not be so aggravated as the local conditions warrant us in believing they will be; and if this source of supply were adopted, for the many natural advantages which it possesses, filters could be built later, if found necessary.

Then, in the second paragraph below that:

If, instead of locating the intake at the point proposed in Indian Bay, it were extended about 5 miles further, passing through the bay and narrows to the open water of Shoal Lake, a supply could be obtained which would probably not require filtration.

Q. Now, on page 10, section 11 of the summary, I will read this:

In natural quality, the other three water supplies stand in the following order of excellence: Shoal Lake, Winnipeg River, and Red River. All of these waters require treatment; the Winnipeg River water and Indian Bay water need decolorization, and the Red River water needs clarification and softening. The Red River water needs purification also for sanitary reasons. The other two sources are better in the latter respect, and Shoal Lake is the better of the two. After being subjected to their proper treatment we place the three sources of water supply in the following order of excellence: Winnipeg River, Shoal Lake, and Red River.

A. That is the statement there. But the treatment that was had in mind was not the same for all the waters. The treatment of the Winnipeg River water was the most complicated of all. That was for the removal of odors, and for turbidity, and for bacteria. The Red River water was the same, and for softening in addition. The Shoal Lake water was nothing except perhaps a straining, or aeration, if anything were necessary.

Q. In speaking of the Winnipeg River water, on page 61 you make this statement:

It would be an easy water to treat, however, and the purified water would very closely approach the requirements of an ideal public supply.

That was correct with regard to Winnipeg River water?—A. Yes, I think that is correct still, although my impression in regard to it is not so favorable on this last visit as on the first, on account of a little more extended knowledge of the algae growth in some of those little bays out from the river. But just what effect they have I do not know; nobody knows.

Q. On this last occasion you were employed, Mr. Fuertes, have you investigated the Winnipeg River?—A. No, we were asked to report on Shoal Lake only.

Q. And you were not asked to investigate Winnipeg River sources at all?—A. No; our instructions did not cover that.

Mr. McLennan. I would like to put in, for the information of the Commission, the summary portion of this report of 1907. It is a very exhaustive report.

Mr. Powell. Mark the portions you want inserted, and put it in as an exhibit.

Mr. Campbell. I would like to have him call the witness's attention to the parts he intends to put in, because this is evidence by way of contradiction. I do not care much, except I think Mr. Fuertes has satisfied you, so far as you care about it.

Mr. POWELL. Call attention to the portions you want to offer, and have them identified.

Mr. CAMPBELL. How long is it, Mr. McLennan? What page is it?

Mr. MCLENNAN. The comparisons of the different supplies, Part VI, pages 55 to 67 I would like to offer. Mr. Fuertes is familiar with the report, I assume, and perhaps he can tell us if there is anything in that data contained in there that is not correct as of the present date?

Mr. CAMPBELL. No, that is not it. As I understand it, Shoal Lake and Indian Bay are treated throughout this report as if they are two separate sources of supply, and one has to study very carefully to distinguish them. They have eulogized the river in eight or ten places, I think, and wherever you find that you should ask Mr. Fuertes and he will show you from the context, if he can, the reason why he did it at that point. They have Shoal Lake natural water and Shoal Lake with treatment, then Indian Bay natural water and Indian Bay with treatment, and it would be confusing to a reader. I do not want the Commission to have to study this matter so closely. They are distinguishing at all times between Shoal Lake and Indian Bay water, which this commission spoke of in such a way that one has to study it carefully.

Mr. MCLENNAN. I will specify the different places.

Mr. CAMPBELL. I think you ought to.

Mr. TURNER. I think this report should come in. We have had the report on Shoal Lake. Why should not this come in?

The CHAIRMAN. They are putting it in.

Mr. TURNER. They are referring to isolated parts of it.

Mr. POWELL. How many pages are there?

Mr. CAMPBELL. There are 12 pages of the conclusions. They do find for Winnipeg River; there is no doubt of that.

Mr. TURNER. Mr. Campbell has said that it is a part of his case to show us that this is the most feasible, if not the most necessary, water supply. If Kenora can put in evidence here that there is another water supply equally as good, and which would obviate some of the objections of this one, it seems to me it is proper rebuttal. I think it would obviate this delay to let this whole report come in.

Mr. POWELL. You mean the 11 pages of the conclusions.

Mr. MCLENNAN. The whole report, perhaps, bears on some of this, if you wish to go into the details. But, without giving the comparison in a certain part of the report and then in another part, they give a summary of the total situation. Those really, in brief, deal with the whole situation.

Mr. POWELL. Would the receipt of the summary in evidence be sufficient to meet what you aim to accomplish by the introduction of this report?

Mr. MCLENNAN. The comparison and the summary, I think, is quite sufficient for any purposes I desire.

Mr. POWELL. You can offer that, or so much of it as you think is necessary.

Mr. MCLENNAN. Then I would put in the report as to the comparison, Part VI of the report, which is pages 55 to 67, inclusive, and the summary, which is at the beginning of the book, pages 9 to 12, inclusive.

The CHAIRMAN. That will be received in evidence and marked as an exhibit.

By Mr. McLENNAN:

Q. Mr. Fuertes, can you tell us the distance from Kenora that the proposed Winnipeg River intake was?—A. I can not tell you in miles by the river. It was to have been a little ways from where the Whitemouth River joins the Winnipeg above the portages.

Q. It is within the Province of Manitoba?—A. I think it was some 65 miles from Winnipeg, 30 miles closer than the Lake of the Woods.

By the CHAIRMAN:

Q. What is the difference in cost between the two projects?—A. You mean between the Winnipeg River and the present Shoal Lake?

Q. Yes.—A. Using wood stave pipe lines from the Winnipeg River, for an average daily supply of 48,000,000 gallons, which was the highest we carried out, the construction cost was $10,500,000. The other, the Shoal Lake supply, for 85,000,000 gallons, is about $13,000,000.

By Mr. TURNER:

Q. Did I understand you to say that your later judgment rejecting the Winnipeg supply arose from the fact that, in view of the possible growth of the city, you thought you could not get an adequate supply there?—A. Oh, no. The quantity of water we can get from the Winnipeg River is unlimited, so far as the city of Winnipeg is concerned. There is no question of quantity. I think there is no question of treatment there, although that has been questioned by some people, too.

By Mr. CASGRAIN:

Q. Then what is the reason of the change?—A. In the Shoal Lake we get a gravity supply, with no complications whatever. The water runs out of the lake to the town for a sum of money not much in excess of what we would be limited to with a pump supply from the Winnipeg River. We get nearly double the supply from Shoal Lake. We get also water which is undoubtedly less likely to trouble from growths which give odors and tastes than from the Winnipeg River.

By Mr. TURNER:

Q. That is on account of bacteria, or things of that kind?—A. It is free from pollution. It probably never would be built up to so as to interfere with the water.

By Mr. CASGRAIN:

Q. After going into this matter very thoroughly, you have come to the conclusion that the report you made to the city of Winnipeg in 1913 recommends the most feasible system for a water supply to Winnipeg at the present time?—A. It is the best system we could find.

By the CHAIRMAN:

Q. And for an expenditure of about $3,000,000 more you get, by diverting the waters of Shoal Lake and Lake of the Woods, double the quantity that you would get from an expenditure of $10,000,000 in the Winnipeg River?—A. Very nearly double the quantity.

By Mr. POWELL:

Q. The Winnipeg is uphill, I suppose, to Winnipeg city?—A. Yes; but there is a high ridge between the two. After you cross the Jules muskeg, or in that neighborhood, a few miles from Winnipeg, from the Whitemouth, the ground rises away up, and drops down to the river. There is a summit there, I think, of 100 feet or more to pump over to get the water out of the Winnipeg River.

Q. What is the relative height of the intake to the Winnipeg?—A. I think these profiles will probably show that. The Winnipeg River elevation was about 873 feet, and the summit was about 940, and the city of Winnipeg is 760.

By Mr. MAGRATH:

Q. This report of the 20th of August would indicate that you have been given no option in deciding where Winnipeg would get its best water supply. I understand from your statement that that is not correct. The opening paragraph of this report states—

That the Board of Consulting Engineers be instructed to submit report on the best means of supplying the Greater Winnipeg Water District with water from Shoal Lake, together with estimate of cost and general plan of the work.

I understand from your testimony that you reached that conclusion yourselves, that Shoal Lake was the proper place to go. This report does not indicate that.—A. It does not indicate that. The instructions were limited as to what was given there in the text. That is, the written instructions. But the matter was discussed by the administration board with us there, and I do not remember just what it was; it was never given to us in any written form, but we understood that we had carte blanche to look into the relative merits, as we saw them, of all those supplies there. The ground water supply was cut out, because it would not yield the quantity. But if any reason occurred to us why there were special reasons for differing, or going otherwise, we might so report. This whole matter, as I understand it, of the supply is one which was practically settled by that election. They voted on whether it would be Shoal Lake or nothing. Was not that it, Mr. Campbell?

Mr. CAMPBELL. The last one was that. But that was after your report. Your report, I suppose, made the people there unanimous.

By Mr. MAGRATH:

Q. You see, you have two reports on file from technical men, the first report supporting the Winnipeg River, the second report indicating, as I say, that you had no option; that you are told to go to Shoal Lake. With your explanation as you have given it to us, I see the situation.—A. There is a statement in this 1913 report, I think, in which we say that we considered it the best source for Winnipeg.

By the CHAIRMAN:

Q. Did you take into consideration the quantity of water that could be obtained from Shoal Lake to reach the maximum demand of Winnipeg of 85,000,000 gallons?—A. We made some tentative figures. We had not the information that has since been brought out at this meeting. Our estimate was not intended to be exact as to the amount that could be yielded by Shoal Lake. Now, we thought

the watershed of Lake of the Woods, 26,000 square miles, would afford whatever depths it might need, and we thought that Shoal Lake would yield as much as needed for many years to come, and we not have to depend on the Lake of the Woods at all.

Q. In view of the testimony with respect to the drainage area of Lake of the Woods, the precipitation, evaporation, etc., is it now your opinion that water will have to be drawn from the Lake of the Woods, in addition to the water taken from Shoal Lake, in order to meet the needs of the city of Winnipeg?—A. Basing my statement on the testimony that is given here, that would be the case. I do not know that I am ready to accept it, however, at the present time, as conclusive.

By Mr. CAMPBELL:

Q. You think there will be some precipitation?—A. I do not know. The testimony which has been presented has not been conclusive yet as to the yield of those watersheds. But what we wanted was water for Winnipeg.

The CHAIRMAN. Mr. Campbell, have you any other witnesses?

Mr. CAMPBELL. No other oral testimony. I want to put in a telegram that I will verify as the result of a communication from myself, from the secretary of and one of the largest shareholders of the Winnipeg Electric Railway Co., F. Morton Morse.

(The telegram referred to is copied in the record in full, as follows:)

[Telegram.]

WINNIPEG, MANITOBA, *January 14, 1914.*

ISAAC CAMPBELL, K. C.,
Shoreham Hotel, Washington, D. C.

The Winnipeg Electric Railway Co. has no objection to the city of Winnipeg taking its water supply from Shoal Lake.

F. MORTON MORSE, *Secretary.*

Mr. TURNER. What interest has the Winnipeg Electric Railway Co. in the lake?

Mr. CAMPBELL. They are down the river, and have used the whole of this water, and so does the city.

Then, I wish to put in a letter from the general manager of the Lake of the Woods Milling Co., that is, the users at the foot of the Lake of the Woods, two big mills.

(The document referred to is copied in the record in full, as follows:)

WINNIPEG, CANADA, *January 7, 1914.*

DEAR MR. DEACON: Re Shoal Lake water supply.

Adverting to our conversation to-day re the above.

I beg to confirm the statement that I made that the Lake of the Woods Milling Co. would not object to the city of Winnipeg diverting all water it required from Shoal Lake, being satisfied that the supply required for a city of over 1,000,000 inhabitants would not impair the power owned by this company to any appreciable extent.

I might also add that this company are the largest power users in the Lake of the Woods district.

If this water-supply scheme is adopted by the city of Winnipeg, I would be in favor of both Dominion and local governments setting apart for a forest and game reserve all the territory within 5 miles of Shoal Lake, to prevent future contamination to the waters. This could easily be accomplished at the present time, as there are very few settlers in the district.

Yours, very truly,

LAKE OF THE WOODS MILLING CO.,
W. A. MATHESON, *General Manager.*

His Worship Mr. T. R. DEACON,
Mayor City of Winnipeg.

Mr. CAMPBELL. It is in evidence that there is a town of Keewatin at the foot of Lake of the Woods, and I put in certain copies of communications between them and their representative at Toronto in the local legislature, when we were applying for the order in council which has been put in.

(The documents referred to are copied in the record in full, as follows:)

TORONTO, ONTARIO, *February 26, 1913.*

TOWN CLERK: City of Winnipeg here pressing Government to take water from Shoal Lake, if you have representation to make in opposition, wire minister of lands for appointment and send delegation to oppose. Urgent.

MACHIN.

Capt. H. A. C. MACHIN, M. P.,
House of Assembly, Toronto, Ontario.

Council no representation to make against Winnipeg water supply.

W. J. CRAIG, *Clerk.*

I William J. Craig, clerk of the town of Keewatin, hereby certify that the above are true copies of the message received and the reply thereto.

[SEAL.] W. J. CRAIG, *Town Clerk.*

KEEWATIN, ONTARIO, *January 6, 1914.*

Mr. CAMPBELL. I want to put these in, Mr. Chairman, because, excepting the town of Kenora, I think now we have not only no opposition, no one silent or staying away, but I have brought them all here, so that in dealing with the matter you have every possible party before you.

Mr. MCLENNAN. I have reason to think that that letter or telegram, whichever it is, would not be obtained from the town of Keewatin at the present time. At that time it was done under circumstances which I need not go into here.

Mr. CAMPBELL. That may be. We all know how municipal feeling changes.

Mr. CASGRAIN. What is the date of that?

Mr. CAMPBELL. The date was last spring, when they made that answer; but the clerk of the town, who is under no obligation to the city of Winnipeg, certified it on the 6th of this month. They are both certified on the 6th of the month, one by the president and one by the municipal clerk, and my experience with municipal clerks is that they would be a little jealous of handing out documents against the wishes of their constituent bodies.

Mr. MCLENNAN. I may have been misinformed.

The CHAIRMAN. Have you anything you want to offer, Mr. McLennan?

Mr. MCLENNAN. I have no evidence to offer whatever. I might state that, from the standpoint of Kenora, our attitude has not been to deprive the city of Winnipeg of an adequate water supply. Nor do we question the fact that they require a supply of water other than what they have. Our contention is, and has always been, and we thought and we still think, that we have strong reasons for believing that there is no need whatever for them to take their water from Shoal Lake. It is with that belief that we have been taking the attitude that we have. Of course, we are not a very big place, but we have expended considerable money in the development of

our power, and are anxious to make the best of it, and think that it should not be detrimentally interfered with, so long as there is no real occasion for it.

We are interested not only, of course, in the power that we own, but the other power within the municipality; that is, as a municipality we are interested in protecting the assets there. That is our chief point of interest.

The CHAIRMAN. It is your contention that the diversion of the water of Shoal Lake is not absolutely necessary to give Winnipeg an adequate and efficient power water supply?

Mr. MCLENNAN. That is the basis of all our contention.

The CHAIRMAN. But that they could get their supply from the Winnipeg River below Kenora without jeopardizing the power interests at Kenora?

Mr. MCLENNAN. Exactly.

The CHAIRMAN. You take into consideration statements of fact made here by the engineer last on the stand, that getting the water from the Winnipeg would only be at an expenditure of $10,000,000, and then they could get only about half the supply or quantity that they could get by an expenditure of $13,000,000?

Mr. MCLENNAN. A reading of the report of the commission of 1907 would not indicate that. I think if the commission will read that report, which is most searching and thorough, dealing with the whole question, you will fully appreciate the attitude that we take. That report was handed in and it was, to use the common expression, pigeon-holed; there never was a thing done with it, or attempted to be done, until when certain conditions came about five years later. Then the question is taken up entirely regardless of that report—is taken up and gone at straight for Shoal Lake.

Mr. CASGRAIN. What is troubling me is this: Can you point out to me anything that was said before the commission here to justify us in coming to the conclusion that there would be any present damage done to the industries of Kenora or the town of Kenora generally, or any future damage, by reason of the diversion that is proposed?

Mr. MCLENNAN. At present there is no question about it; it would not concern us at all under present conditions, because we have abundance of water. We have water to run away, there is no doubt, and the fact that the water has been allowed to run away, by leakage and otherwise, through the Norman Dam, of course, is just because at the present time we do not need to take care of it. But there is at the present time under negotiation the development of that Norman power.

The CHAIRMAN. Is that the power that the Backus people are interested in?

Mr. MCLENNAN. Exactly. When that power is developed to its full capacity, the different powers there being controlled by a different proprietor, there is likely to be trouble in maintaining a sufficient water supply to operate them to advantage. The town of Kenora perhaps feels particularly concerned. We have already entered into contracts. We have one contract in particular requiring us to deliver a certain amount, a thousand horsepower, for a period of 42 years, with heavy penalties should we fail to be able to make good.

Mr. POWELL. Will those penalties be enforced if the law steps in and makes it impossible to perform them?

Mr. McLENNAN. We might find a way out of it. But we have those things to consider. Of course, we have to depend largely upon the making of the best use of the power we have.

As I say, I am not here prepared with testimony. There are things that I would like to bring before your commission from a local standpoint, and perhaps in an engineering way, if your commission think that evidence might be produced from our standpoint that would give you light on the situation that you do not already possess. Of course, it appears to me, as it naturally would, that at this sitting everything has appeared favoring the application. We have no testimony to show it otherwise. If we might have an opportunity of making our side of it appear before you in a better light——

The CHAIRMAN. Do you question the facts, the scientific facts, the engineering facts, that were presented here regarding levels, areas, run-offs, etc.?

Mr. McLENNAN. I am not in a position to question them at the present time.

The CHAIRMAN. So you do not know that you could produce any evidence that would present a different state of facts than that which has been presented?

Mr. McLENNAN. I am not sufficiently versed in the engineering phases of this to make any statement that I would be able to do so. We are desirous, of course, of maintaining, as far as possible, a uniform level of the lake. We are interested in that question from various standpoints, both from the standpoint of campers, in which connection I might say that our place is attaining to some prominence, as well as of power users, and navigation, and otherwise. We depend on those industries largely, and what does impress us is that the granting of this application would deprive us of one of the principal sources of conservation that might be utilized in the maintaining of uniformity of levels on the Lake of the Woods.

Mr. TURNER. Do you appear for anybody other than the city of Kenora?

Mr. McLENNAN. I do not, other than the city and the board of trade.

Mr. POWELL. Mr. McLennan, in case we decide to approve the application, or the amended application, as the case may be, what do you say in respect to this clause of the treaty, in article 8, at the foot of page 15:

> The commission in its discretion may make its approval in any case conditional upon the construction of remedial or protective works to compensate so far as possible for the particular use or diversion proposed, and in such cases may require that suitable and adequate provision, approved by the commission, be made for the protection and indemnity against injury of any interests on either side of the boundary.

There is a little ambiguity. It is not the most elegantly framed piece of English; but it would appear to me that we have power to make an indemnity as a condition subsequent to any authority that we give. What do you say in respect to that?

Mr. McLENNAN. I can very readily say that if we can be protected, we are perfectly satisfied.

Mr. POWELL. What would you ask in the way of indemnity; what is your own idea?

Mr. McLENNAN. At the present time I am not in a position to make a suggestion even on that point. Much may depend on what may be

done, perhaps, by this commission in the question that it already has in hand with regard to the maintaining of lake levels and the conserving of the waters.

Mr. POWELL. I am just offering a suggestion. Suppose we come to the conclusion that some indemnity should be made; we do not know if there is any interference with vested rights there; we have not got into that. You people have not supplied the evidence of your title. But we could make it cover vested rights, if there are any vested rights. Would you not suggest some such provision as this, that the approval be granted subject, however, to the payment by the city of Winnipeg, to parties injured, of such indemnity as they might obtain in the courts of the country, Province, or wherever the venue should be situated?

Mr. MCLENNAN. At the present time I would not like to acquiesce in that. I may say that it is not the spirit in which we have been approaching it, as to what amount of money we could get out of it.

Mr. POWELL. Yes; but you do not want to be wronged. If you are wronged you want to be paid for the wrong.

Mr. MCLENNAN. We do not want to be wronged, and we particularly do not wish to be interfered with unnecessarily. That is particularly our belief.

Mr. POWELL. Now you are back to the old question.

The CHAIRMAN. Mr. McLennan, is it not a fact that the basis of the opposition is largely on account of prospective benefits in the industrial development of your town which you may receive in the future in consequence of this 250 horsepower, or whatever it may be, resulting from the industrial development due to the utilization of this additional amount of water?

Mr. MCLENNAN. Certainly.

Mr. POWELL. It would come to this—I throw out the suggestion simply for your benefit—if you do not press it you can not expect us to thrust it on you.

Mr. MCLENNAN. I quite see the force of your suggestion in our interest. I can only leave that with your commission to exercise your best judgment in dealing with the situation fairly.

Mr. POWELL. These other corporations waive their rights; they assent to the thing, and you would not be entitled to the full 260 horsepower, but to whatever proportion your present proportion is of all the power utilized.

Mr. MCLENNAN. From the standpoint of damage no doubt that would apply, and I am impressed with this idea that from the standpoint of damage anything that we would be entitled to claim, perhaps, in a case of this kind would be very far short of the full effect that the matter might have upon us.

Mr. POWELL. Would you prefer a lump sum or an annuity?

Mr. MCLENNAN. The feature of the protection of our interest, saving us from getting into complications with other owners in the division of what power we may have, is one of the important features. We have already had considerable trouble and expense in connection with our water power.

Mr. CASGRAIN. Mr. McLennan, I do not know whether I misunderstood the witnesses, but it seems to me that what they said was this, that the diversion of this water from Shoal Lake would practically make no difference in Kenora at all. Am I right in that or not?

Mr. McLENNAN. If I could fully appreciate that statement I would be perfectly content—if it would not affect us.

Mr. CASGRAIN. That is what I gathered from the evidence. I may be wrong. I am speaking for myself alone.

Mr. TURNER. I do not see how you can get that impression. It certainly does deprive riparian proprietors of the ability to get flow sufficient to get 260 horsepower. That is some injury. Now, what is that prospective power worth at this time?

Mr. POWELL. And if the city of Winnipeg is taking it, they ought to pay for it.

Mr. TURNER. That is, if Mr. McLennan wants to urge that. I do not know that he wants to urge this against Winnipeg.

Mr. McLENNAN. I would not at the present time like to state my attitude on that point with regard to compensation. As we feel it, it can not be so serious a matter for us were the water being taken from the Lake of the Woods. We may have an undue appreciation of the benefits that Shoal Lake is to us in serving us as a sort of a natural reservoir, that tends to keep up our supply in the low-water times, and of the benefit that it might be to us in any conservation scheme that might take place.

Mr. TURNER. You understood that we were to dispose of this matter—that you were to present all your case here at this time?

Mr. McLENNAN. My impression really was that this would be only a preliminary hearing. I think I referred to that at the outset. It had not occurred to me that the matter would be disposed of at this time. I did not know whether the commission was conversant with the local conditions, and so on, or that we would be expected to bring our witnesses here. The applicants, of course, had their witnesses.

Mr. CASGRAIN. What notice was given to the town of Kenora of this hearing? Have you a copy of the notice here?

Mr. BURPEE. I think so.

Mr. CAMPBELL. It was sufficient. They put in a printed reply.

Mr. CASGRAIN. Yes, that may be so. But Mr. McLennan said that he thought this would be only a preliminary hearing. I want to know what notice he got.

Mr. McLENNAN. There was no notice that said it would only be a preliminary hearing, but I understood that there would be a hearing of this matter.

The CHAIRMAN. Are you not confounding this with the investigation of the Lake of the Woods levels? When the commission visited Kenora we stated then that that was only a preliminary hearing, that when the engineers made their report there would be a further and full hearing.

Mr. McLENNAN. I admit that my impressions were perhaps derived largely from that, and from other matters, in which I had understood preliminary hearings were had.

The CHAIRMAN. The difference between this proceeding and the other reference is that our jurisdiction is final here, and we hear and determine. The other we are investigating.

Mr. McLENNAN. I was aware of the hearing, but as to the nature of the hearing I did not know. I have not any question in my mind that notice was given.

Mr. CASGRAIN. Mr. McLennan, suppose we consider your application for an adjournment; what evidence could you offer? Are you

in a position to say that you could offer any evidence in contradiction to the evidence given here to-day and yesterday?

Mr. McLENNAN. I am not prepared to say that I could.

The CHAIRMAN. You may proceed, Mr. Campbell.

Mr. CAMPBELL. I will be very brief. I do not understand my learned friend is more than suggesting a postponement or a further consideration. He at least should have suggested the character of the evidence.

The CHAIRMAN. It is a little late now to come in at the close. In fact, I do not understand that Mr. McLennan makes any application for a continuance of our hearing, so we will proceed.

Mr. CAMPBELL. No, I understand that. The only witness I have produced here who is for the city of Winnipeg originally is Mr. Fuertes. All the others are Government engineers, or men keeping the records. I can not ask you to unduly hasten a decision, but, in view of what Mr. Fuertes said about the work that had to be done so as to save the loss of a year, and the peculiar character of the intervening country for construction purposes, while I do not ask you to fix a date for your decision, I do not wish my learned friend to postpone us by any application for new evidence, unless he can state what it is going to be.

We have shown, surely, sufficiently—I will not reargue it—that the Shoal Lake supply is the desirable source of supply. It is possible that the Winnipeg River might be a fairly good substitute, or a second one; but, in view of what Mr. Fuertes has said as to the relative cost, 48,000,000 gallons, costing a little more than three-fourths of what 85,000,000 does in the other case, I think the financial part of our case is amply supported in that respect.

On the question of the objection made by Kenora, Mr. McLennan admits that they have plenty of water now. It is future requirements they are pressing. I am perfectly willing to admit that probably in the very near future power users down there will not have enough water. The development is going on so rapidly that we can not anticipate to what extent hydroelectric power will be made use of along that rock ridge extending from Kenora westward to Keewatin. But I submit, gentlemen, that it is the present you are to look at. They have not, it seems to me, riparian rights down there, because they are there, as against the future, and to just sit down and wait until their own increase in population, or the inducements they can hold out to some new industries, shall exhaust their share of this power. I submit this question has to be looked at to-day, or as it was at the time we made our application and had it fully completed before the commission. Otherwise an enterprising prospector along the borders of the country could, unless some local restriction kept him out, put down one well pit, and then claim that in a few years there would be population enough to run eight turbines, and just hold the ground because he was on the shore of the water. I submit that prospective profits and advantages are not to be considered in this case.

Senator Turner raised a point as to the riparian rights of parties under the common law. I am bothered about how to give my view of the law as to those rights, further than this, which was included in the Senator's statement, that a party on the shore can take and use water, being under obligation to restore it to the current of the stream

for the use of those below him undiminished in quantity except for necessary diminution, perhaps evaporation in the irrigating of a man's farm, because that is a common law riparian right—undiminished in quantity and not prejudicially affected in quality. But that common-law riparian right merely goes to the right of the person who owns the immediate shore, and does not go back to the community, which may be half a mile or a mile away, as in a corporate town, and surely it can not apply to a source of supply in a large lake.

Mr. POWELL. Kenora, as I understand, is the riparian proprietor, the town.

Mr. CAMPBELL. They are at that point.

Mr. POWELL. Then that is not the man back of the riparian proprietor; it is the riparian proprietor himself.

Mr. CAMPBELL. That can not surely apply to the whole water of that lake. There is no evidence put in by Mr. McLennan, and I did not put any in, because I understand there is none available, to show any limit, or authorized limit, for the use of water there by the provincial or other authorities. I submit this proposition as to riparian rights: If the city of Winnipeg, or some trustee for the city, should, at Keewatin, where the bench is flat, buy 10 acres between Lake of the Woods and the river, and put down a new artificial channel like the Lake of the Woods has—they have two of them—and started a hydroelectric plant generating energy for use there or transmission to Winnipeg——

Mr. CASGRAIN. Please repeat that.

Mr. CAMPBELL. If we, or some trustee for us, purchases a piece of land so as to make us a riparian owner of Keewatin, where the bench of rock is very little above the water, and put in artificial channels, like the Lake of the Woods people have, put our electric works right near their mills, we could set up a system of standards and carry that energy into Winnipeg, and I do not see any objection that Kenora or Lake of the Woods or anyone else could make to that. In that case, once we used the water, it would go down into the Winnipeg River, and all riparian right then to the use of that water would be gone, unless somebody pumped it back. So that if we could, for hydroelectric purposes, the generation of hydroelectric energy—because we are on the same level, the lake is level for all practical purposes as between riparian owners—if we on the same level could use the water for hydroelectric energy, we could claim and use it for putting our pipes there for ordinary waterworks purposes at Keewatin. But at Keewatin there is ample room for making more artificial courses. If parties went in with cut-throat competition in hydroelectric energy, I do not see anything to prevent them from opening the channel.

Mr. TURNER. As to these artificial water courses which have been cut through there, I should say they have no rights except to the extent that they had appropriated and used water. But there must have been a natural channel through which the water flowed from this lake into the Winnipeg River.

Mr. CAMPBELL. There were two, the Kenora one and the Norman Dam.

Mr. TURNER. If the common law principle of the rights of a riparian proprietor applies to a lake at a certain level, I am very doubtful about that, but if it does, then the diversion of water enough to create 250 horsepower takes that much water from that natural channel on

which there are riparian proprietors, and deprives them of the prospective use of that which they have a right to at common law at any time. They have a right to have a continuing flow there, even though they do not use it at all. As to this trade on the natural channels, if the principle of the common law applies, they are deprived of so much water running down through those channels.

Mr. CAMPBELL. I submit that surely can not apply to the outlet of the great lake.

Mr. TURNER. I do not say that it does.

Mr. POWELL. But your artificial channel has no rights. It does not create riparian proprietors in the same sense the natural channel does, unless the legislature has given them the power. That is a right that affixes to the water going in its natural channel, as was stated in the case where Kingdon delivered that classical judgment before the House of Lords, that any riparian farmer may even divert it from its course, as long as he does not take it off of his own land, and returns it to emerge from his land undiminished in quantity and unpolluted in quality. That is all right. But no man has a right who hasn't it by virtue of being a riparian proprietor on a natural stream to create an artificial channel and steal the water.

Mr. CAMPBELL. I am not sure about that, Mr. Powell. Supposing one proprietor has 300 yards along the river, and another has 100 yards above him and 100 yards below him and around him; he can surely make a channel there for irrigation purposes, or any purpose.

Mr. POWELL. He may divert the water for three purposes. He may divert it for domestic purposes; he could do that absolutely. He can do it for the purpose of his cattle. He can do it, if he is a riparian proprietor, but only if he is a riparian proprietor.

Mr. CAMPBELL. And he is not responsible to the man below for all the water, only for that much water that the man below needs.

Mr. POWELL. Certainly; not for what he needs. It is not necessary that the man below should use it.

Mr. CAMPBELL. He need not use it, but he is not entitled to a monopoly of that water. It is so much water as he would need.

Mr. POWELL. He is not entitled to a monopoly of the water; he is entitled to no proprietary interest in the water whatever except its use as it passes over his land, but he is absolutely entitled to that.

Mr. CAMPBELL. Exactly.

Mr. TURNER. If it is valuable for power, and that power value is diminished by diversion of the water above, is he not injured?

Mr. POWELL. I do not think he is, under this treaty.

Mr. TURNER. That is another question.

Mr. CASGRAIN. To what extent can the town of Kenora be considered as a riparian owner?

Mr. CAMPBELL. They own on the east side I suppose 300 yards, and on the other side 200.

The CHAIRMAN. Is the title in the city of Kenora, or is it in individuals?

Mr. CAMPBELL. I suppose the city has some rights there as a corporation, under our local laws.

The CHAIRMAN. I mean the actual title; is it in the city?

Mr. MCLENNAN. It is owned by the city.

Mr. TURNER. Is the power from the water from the lake level, or is it gathered up after it reaches the channel of the stream below?

Mr. CAMPBELL. It almost becomes a river before it strikes your wheels, does it not?

Mr. MCLENNAN. It is in the form of a river for perhaps 75 yards.

Mr. CASGRAIN. I suppose the town comes here in a dual capacity. It says "We are the riparian owners, to a certain extent, and we come here also as representing generally the citizens of the town of Kenora." Is that right?

Mr. CAMPBELL. Yes.

Mr. CASGRAIN. How can they, in that second capacity, be considered as riparian owners?

Mr. CAMPBELL. Certainly not in their second. In the first I think they are to be restricted to the rights as of the time this application is heard, and restricted to their rights to-day, of course, and to those rights as ascertained by to-day's uses. That is the way I look at that, looking at them either as individuals making up the inhabitants, or as an incorporated body, and the town owns, Mr. McLennan says, the property. Their rights, of course, are to be ascertained as of to-day. But I submit those rights are to be ascertained as based on the uses of to-day, and not on prospective uses.

Mr. POWELL. Supposing a man had the water power, and he says, "I am not going to develop it now; I am holding it for a very high price in the future." Would he not be entitled to the unearned increment?

Mr. CAMPBELL. I do not think he would, on the water. I believe he would on the land, perhaps, if there was somebody who wanted to buy the same right from him.

On the question of amount—that has been dealt with by the witnesses—I will not trouble you any further, gentlemen, on that point. Col. Potter discussed the 1.42 inches, and said an engineer could not measure it. Mr. Johnston and Mr. Chalies said that it was a matter, when you distributed it, not to be considered. But I admit that mathematically if we take 260 horsepower away, there is that much taken away, and there might come a day when there was much more demand than for the thousands of horsepower spoken of to-day that exist there, when our 260 would be important. But, I submit, prospective things should not be considered.

The only evidence on the question of damage is this: That the town is now allowing a large user, at a cost less than the capitalized value to the town to produce it, in order to bring them there, using it as a bonus under what we all agree is the old vicious principle of inducing people to came in by giving them something; that probably to save them from doing that we are giving them a benefit, if they propose to repeat that experiment.

I assume, gentlemen, you are not going into the question of possible damages, but, to show how difficult it would be to deal with the question of damages, just consider it would not be what they get per 24-hour horsepower, or, if distributed over the working electric day, that they could make each horsepower sell nearly for the price of two; but it is the profit after the expense of installation and operation. You would have a reference compared with which six months in the master's office would be a small incident, for you would have to go into all those questions, to take up the questions of how much damages you are going to allow them, because it is not the total gross amount they get for their electrical output, or power in any other shape, but the profit of future installation.

Mr. TURNER. We have no data here on which we could assess any damages.

Mr. CAMPBELL. No; none at all.

Mr. TURNER. The question is whether we could not see some damage which will be inflicted, for which some conditional provision ought to be made.

Mr. CAMPBELL. I will leave the law on that to you.

Mr. POWELL. I have been through the mill on that. If you want to get the relative values of power undeveloped and power developed, Ontario publishes a blue book of all the water powers and mills for undeveloped power and developed power. That is quite a little pamphlet. I had it in a case, and if you will get hold of that you will get all the information you care to gather.

Mr. CAMPBELL. I will look that up. I will not trouble the commission with remarks upon the importance of a good water supply.

Mr. CASGRAIN. You need not talk to anybody from Montreal about that.

Mr. CAMPBELL. No. You have been all actively and anxiously concerned in some of these problems in your official capacities. If I I should refer to any remarks on that, it would be to the statements of one of the sanitary officers connected with the commission, Dr. McLaughlin, in the May number of the Technical Science Magazine for last year, in which he has brought in some figures that are striking and startling as to typhoid fever and other diseases due to impure water. But it would be wrong for me to take up your time in discussing that.

I have only to add that as to the other users we have not only filed as to the Lake of the Woods, but we have gone down the river, because they might complain. Down-the-river people might complain of us if we took the water away from them and without return. We have brought them here before you. I thought this court was entitled to every effort we could make in that direction, because you gentlemen are resident far apart from each other, in dealing with these questions, and it occurred to me we should put you in possession of all the facts. We have brought those facts here, and the only objector is the town of Kenora, and I do not think Mr. McLennan feels, from what he said—and he has acted very fairly throughout—that the case is one in which we should be prevented from getting the order, or should get it upon terms. The Ontario Government has imposed terms that, I take it, will be operative. The town of Kenora has its remedy. If we should take more than 100,000,000 gallons, we should compensate them in the manner provided under the Ontario arbitration act. I think therefore if, in your order, you referred to the terms to which we have submitted in obtaining the Ontario order in council, with an approval of them, as if they were operative, and gave us simply an order allowing us to take the water under the treaty, under the terms of the application, you would be doing ample justice.

Mr. CASGRAIN. You say in terms of the application. You say in paragraph 2 of the application—

Your petitioners are desirous of obtaining the approval of the Government of Canada for the use of the waters of Shoal Lake (situate in the Provinces of Ontario and Manitoba) for domestic and sanitary purposes by the inhabitants of the Greater Winnipeg Water District, and for such purposes the right, privilege, and power of constructing a system of waterworks with the pipe line or intake pipe placed in said Shoal

Lake at or about latitude 49° 38′ N., longitude 95° 7′ 50″ W., in the Province of Ontario, and from there carried and connected by a pipe line through parts of the Provvinces of Ontario and Manitoba to a point or points in the Greater Winnipeg Water District, and for said purposes to exercise the powers conferred by an act of the Parliament of Canada to enable the city of Winnipeg to get water outside the Province of Manitoba, which said act was passed in the session of 1912–13.

It has been proved here that you are not only taking the waters of Shoal Lake, but also of the Lake of the Woods.

Mr. CAMPBELL. We are affecting the Lake of the Woods, but are we ——

The CHAIRMAN. You are taking the water of Lake of the Woods.

Mr. CAMPBELL. It will come to us.

The CHAIRMAN. As it comes to you. My suggestion was that you amend by adding "and Lake of the Woods." Then the order can cover both, to remove all questions of jurisdiction and everything else, and protect Winnipeg hereafter.

Mr. CAMPBELL. I would certainly make that motion, in view of the evidence.

Mr. CASGRAIN. Under article 23 of our rules you can make an amendment.

Mr. CAMPBELL. I am very glad of the suggestion.

Mr. TURNER. I think you ought to put in, if you amend it, that Shoal Lake is an inlet of the Lake of the Woods, if you want to get the jurisdiction of this commission.

Mr. CAMPBELL. I suppose by applying we admit the jurisdiction. I am willing to admit it for the Greater Winnipeg water district.

Mr. POWELL. You can put it "Shoal Lake and Lake of the Woods."

Mr. CAMPBELL. I will act on that suggestion. From the evidence I think we have to. Will it be necessary to file a motion, or will the oral motion be sufficient?

The CHAIRMAN. I think it ought to be put in the record. You might make it orally, but let it go in the record.

Mr. CAMPBELL. That after the word "Manitoba," in the second line of clause 2, there be inserted the words "and of the Lake of the Woods"; and that after "Shoal Lake," where it occurs in the first line of paragraph 4, there be inserted the words "and the Lake of the Woods"; and that clause 7 be amended by inserting, after the words "Shoal Lake," in the sixth line of said clause, the words "and the Lake of the Woods."

The CHAIRMAN. If there is no objection the clerk will enter an order amending the application as requested by counsel for the applicant.

Mr. CAMPBELL. That is all I will offer by way of argument, Mr. Chairman. I am sorry I have taken so much time.

The CHAIRMAN. That concludes the case, then, on both sides.

Mr. MACINNES. With your permission, Mr. Chairman, I would like to put in a communication on behalf of the Government of the Province of Ontario. It reads as follows:

The Government of Ontario is not only willing but anxious to have the commission investigate the question upon the merits, as they are anxious not to do anything or be a party to any action that might seriously interfere with navigation or water powers upon international waters. The Province of Ontario, being the owner of the water, land covered with water, and water powers within the Province, is vitally interested in all questions in any way relating to or affecting international waters and the beneficial results that should flow from the treaty on this question; and from the deliberations of the commission can only do so if the Provinces and States affected are willing to cooperate in a broad and generous spirit.

So far as the Dominion Government is concerned, I do not think I need say anything further than this, that I think the evidence has fully established the propositions which are set forth in the order in council which was filed at the opening of the proceeding—first, that Shoal Lake is not in itself a boundary water; secondly, that this application, as shown by the evidence, will result in a diversion of boundary waters, namely, the waters of the Lake of the Woods; that that might have been such as to affect navigation and the joint interests of the two countries. But the evidence has shown that the effect that will be had will be such as can be disregarded. Also, I think that it was a proper action on the part of the Dominion Government in allowing and directing that this application should come before you, in view of the fact that the investigation to-day is of matters within the scope of matters already before you; in other words, that it would be a very undesirable practice that whatever view the Government might have of an application, it should deal with it of itself when it in any way touched a matter that was already before this commission. I think, however, that the jurisdiction has been made out; that it is open for you to deal with, and, so far as the Dominion Government is concerned, they hope the application will be granted.

As to Kenora and any claim for possible damages, that is not within my province to speak of. I would only call attention to the fact that no claim has been formulated in terms by Kenora, and if there should be any damage, that, I think, is already covered by the order in council passed by Ontario.

I had thought of referring to the commission one fact which is a very interesting and historical one, but I think you already have sufficient material before you on the point, and that is this, that by treaty it has already been established between the two countries that Shoal Lake is not a boundary water. The treaty of Paris directed that the boundary should go to the most northwesterly point of the Lake of the Woods. That was again referred to in the treaty of Ghent, in 1814, and the commissioners were directed to find that point. They made their investigations, as you are aware, and published certain plans, and there is one plan contained, which is No. 54, in the sixth volume of Moore on International Arbitrations, which is a plan signed by the commissioners and dated the 23d of October, 1826, in which the most northwesterly point of the Lake of the Woods is fixed.

Then the next step that happened was the Ashburton-Webster treaty of 1842, which fixes a northwesterly point of the Lake of the Woods at a particular latitude and longitude, which is as shown on the maps to-day. It is also the fact that that is the same point as is shown on this map of 1826, so that the investigation on behalf of both countries, both in 1826 and in 1842, when there was greater material before them, has fixed the northwesterly point of the Lake of the Woods.

Mr. POWELL. That is, to a point east of the Shoal Lake?

Mr. MACINNES. Yes. If you will look at the map, you will see that more clearly made out than would be by any long argument on the subject.

I only wish to add, in conclusion, and not as a mere form of words, that we do desire to go on record as expressing our appreciation of the way in which this application has been dealt with on the part of the

United States, both by its counsel, as evidenced by the brief filed by him, and also by the engineers of the War Department, as shown by the evidence of Col. Potter, who appeared before you. We Canadian interests appreciate it very much, and we hope that it is felt that the application has been dealt with on our side in a similar way, and that future applications will be dealt with by both countries in the same manner and the same spirit.

The CHAIRMAN. If there is nothing further, gentlemen, that closes the case, and we will take a recess until 10.30 o'clock to-morrow morning.

(Thereupon, at 5.10 o'clock p. m., a recess was taken until to-morrow, Thursday, January 15, 1914, at 10.30 o'clock a. m.)

THURSDAY, *January 15, 1914.*

The commission reconvened, pursuant to the adjournment, at 10.30 o'clock a. m.

Present: All the member of the commission.

Present, also, the parties interested, as heretofore noted.

The CHAIRMAN. Gentlemen, the commission has reached a final conclusion in the matter of the application of the Greater Winnipeg water district, and Mr. Casgrain will deliver the conclusion.

Mr. CASGRAIN. The commission approves of the application as amended, but this approval is in no way to interfere with or prejudice the rights, if any, of any person, corporation, or municipality to damages or compensation for any injury he or it may sustain by reasen of the diversion approved of.

The CHAIRMAN. I would like to say that the formal opinion in the matter will be prepared and filed with the two Governments as provided for under the treaty, as well as the formal order. The formal order will be entered, and the opinion will be prepared and presented to the two Governments as required by the treaty.

APPENDIX.

Reports of Prof. C. S. Slichter and Public Utility Commissioner on Water Supply of the City of Winnipeg.

Winnipeg, *September 6, 1912.*

Dear Sir: At the request of the board of control of the city, and acting under the powers contained in the public utilities act, I proceeded to investigate into the question of water supply for the city. With a view to meeting cases where technical or scientific assistance is necessary, provision is made in the act for the employment of skilled persons in aid of the commission. Under this power, Prof. C. S. Slichter was employed to act in the matter. It was highly desirable that not only should the skilled assistance be of the highest order, but that it should be entirely uninfluenced by any local interest. In Prof. Slichter both of these features were found.

The object of the investigation was that there be laid before the rate payers the facts in connection with the water supply and the opinion of a qualified expert thereon. The facts have been fully elicited and made public. Prof. Slichter's opinion is expressed in the inclosed report. The report recited the essential facts. It is unnecessary that they be repeated by me. The material is all at hand for further detail should that be desired.

Prof. Slichter's time allowance for his work was very short. That he was able, in that time, to make a thorough personal examination and give the matter the consideration evidenced by his report is remarkable.

Although the commission of 1907 recommended Winnipeg River as a source of supply, their report expressly states that Shoal Lake was their ideal. They thought that then such a project was too expensive. Conditions have materially altered. The most sanguine expectations have been exceeded. Prof. Slichter shows the absolute necessity of a high degree of constant filtration of Winnipeg River water; the greater proportionate expense of construction to that source, that the likelihood of manufacturing plants on the river is a strong objection, and that these features offset the increased expense involved in going to Shoal Lake. The imperative need for an immediate increase in supply is emphasized, and the extension of the well system at once is urged. Attention is particularly directed to that phase of the report. It seems clear that that will be an adequate temporary measure.

Prof. Slichter gave most earnest and conscientious consideration to the proposal regarding Poplar Springs and Crystal Springs. His attitude is described in the report. His views are the result of his best judgment, after applying all that he has gained from long study and experience in such matters.

I recognize that one must keep within his proper province, and trust that I am not exceeding my functions when I urge that Prof. Slichter's recommendations be adopted, and that the greater project be taken up immediately. The financial side of the question is of course of high importance. No one who has confidence in the stability of this city and its future can doubt its capacity for this project. The advantage of the undertaking should not be confined to mere corporate boundaries. A scheme might be worked out whereby the environs of present Winnipeg might, on fair terms, secure with the city the inestimable benefits of abundance of the best water. The assurance of unfailing supply is indispensable to the growth of the city. This is now the one essential to that end. Prof. Slichter's words as to the future of Winnipeg are those of a widely traveled gentleman of keen observation and mature judgment. His language is not that of a mere enthusiast. Devotion to the city's present and future interests characterized every moment of the time he spent on this vital subject.

I am, sir, respectfully, yours,

H. A. Robson,
Public Utility Commissioner.

C. J. Brown, Esq.,
City Clerk, Winnipeg.

September 6, 1912.

H. A. Robson, Esq.,
Public Utility Commissioner, Winnipeg.

Dear Sir: I have the honor to submit the following report upon the water supply of the city of Winnipeg:

THE STANDARDS TO BE APPLIED.

A perfect water supply is worth all it costs. There is no standard by means of which to measure the limit of human effort that should be expended in attaining it.

The safety and permanence, and growth of the dependent civilization is too important to permit expression in terms of ordinary units. The example of Rome has been the guide to all the cities of modern cultured nations. Since that day the water supply of a city has been the most important and the most expensive of its public works. The abundance and purity of the water supply has determined the growth and permanence of the civic communities, and has always been a determining factor in selecting from the group of cities struggling for commercial and industrial supremacy the favored few that should finally be awarded leadership. I trust it is unnecessary to elaborate upon the fact that a perfect water supply is the guardian and producer of wealth, or to explain in what manner a penalty, in wealth and development, must be paid as the price of a supply that falls short in any respect from what it should be or from what it might be.

I shall enumerate, substantially as listed in the report of 1907, the qualities that characterize a perfect water supply. Such a supply must be: (1) Safe and wholesome from a sanitary standpoint; (2) safe and free from incrustants; (3) free from corrosive ingredients; (4) free from disagreeable tastes and odors; (5) free from suspended matter; (6) free from coloring matter; (7) low in temperature; (8) uniform in temperature.

These items, however, can not be used to rate a water by mere preponderance of good qualities. A water may be condemned by extreme departure from normal in any one of the desirable qualities; on any other basis sea water would rank nearly as high as well water. Failing in a numerical process of weighting the qualities of water, one can merely take due note of all, and express final judgment in terms similar to the following: (1) Excellent, (2) good, (3) fair, (4) poor, (5) very unsatisfactory.

Applying this method to the available supplies of Winnipeg, one may express judgment as follows: Shoal Lake, excellent; Winnipeg River, good; Crystal and Poplar Springs, fair; well near Crystal Springs, poor; present supply, very unsatisfactory.

The above refers to quality only.

WINNIPEG RIVER.

I have visited the proposed intake at the Seven Portages of the Winnipeg River. The quality of the water at this point, I have assumed, was settled by the report of the commission of 1907. I made rough tests of its turbidity and color by means of a white disk. The water, in the condition found on August 25, 1912, would require the treatment recommended in the report of 1907. The suspended matter and color were both high on the date seen by me. In addition to the spores of water plants, algæ, and minute particles common in nearly all river waters, there were numerous small bits of moss, etc., in suspension, which seemed to have been dislodged by the rapid current. The color and all of the suspended matter would be removed by the treatment proposed in the report of 1907, and the sanitary character of the water after proper treatment would be satisfactory.

The estimates of the cost of the supply from the Winnipeg River are printed on page 88 of the report of the commission of 1907. The proposed pipe line was to be 58.3 miles in length, about 7 miles of which is in rock, and to consist of 35,000 feet of 45-inch pipe, 26,400 feet of 54-inch pipe, and 229,700 feet of 48-inch pipe. For a daily capacity of 23,000,000 gallons, the estimates were:

1. Land and right of ways	$18,000
2. Intake works	150,000
3. Pumping station at Winnipeg River	325,000
4. Pipe lines	1,737,000
5. Coagulating basins	65,000
6. Filters	250,000
7. Filtered-water reservoirs	270,000
8. Winnipeg pumping station	370,000
9. Keepers' houses	12,000
10. Telephone lines	11,000
11. Tramway	150,000
	3,358,000
Add 15 per cent	504,000
Total	3,862,000

Since the above report was prepared the electrical power plant of the city has been completed. Steam pumping, as proposed in the 1907 report, would no longer be adopted. The saving in items 3 and 8 would be considerable. On account of the low cost of electrical power it would be desirable to consume more power than originally estimated, and bring water to the city under a higher velocity. This would in-

crease the daily capacity of the pipe line to 35,000,000 or 40,000,000 gallons daily, and would materially postpone the date at which the second pipe line need be constructed.

Comparative studies should be made of the effect on first cost and on cost of operation of cutting down of the diameters of the pipe for the various sections of the line, and the introduction of two or more electrically driven pumping stations (with Diesel auxiliary) in order to cut down the cost of the project and to prolong the period before which a second pipe line would be needed.

The cost of pumping, in any case, would be less than the cost of pumping an equal amount of water from a miscellaneous group of wells in the city of Winnipeg. I assume that $20 per horsepower per year would be a fair rate for the city to pay itself for electrical current taken from its high-tension line near Seven Portages, the cost of new construction and transformer losses to be paid for by the water plant. The load factor would be as near 100 per cent as is practically realizable.

SHOAL LAKE.

I visited Shoal Lake on August 24, 1912, and inspected the various points at which intakes have been proposed. I also made comparative tests of the color and turbidity of the water at various points by sinking a white disk to invisibility. I also determined the temperature of the water at various depths, and took samples of water from these various zones. The date of my inspection was especially favorable, as I undoubtedly saw the lake at the time when the growth of algæ, etc., is at the maximum. The amount of suspended matter in the water was surprisingly small. The amount of pelagic life in Shoal Lake is very small, due in part to the clean, rocky character of its shore and of its watershed. The clean, Laurentian granite and schists have collected together a body of water of exceptional softness and purity. The water in Indian Bay possesses a slight color, and there is also more matter in suspension. The water, both in the lake itself and in Indian Bay, was free from disagreeable odors and taste.

As is well known, the surface temperature of waters in lakes in this latitude increases gradually during the summer months until a maximum temperature is reached, probably about mid-August. This temperature for Shoal Lake is probably not far from 65°. The wind and waves keep the surface waters mixed, so that the surface temperature remains unchanged to a certain depth or layer, which lies at various depths in different lakes. When, however, a certain depth is reached (say, from 5 to 12 meters, depending upon the lake, the latitude, and the time of the year), the temperature suddenly falls, often as much as 10° to 20° in a single meter or two. The layer of water which possesses this rapid fall in temperature has a most important bearing upon water supply taken therefrom. Practically all the life of the lake, the minute crustacea, the diatoms, and the algæ, etc., exist in the warm waters above the so-called "sprunschicht." Below the sprunschicht the water is cold and practically free from living things. Even the fish exist in the upper layers, for here they find their food. Every fisherman knows this, for he seeks bass and muskellunge on the bars or in the shallow water, wehre the fish find their food; that is, in the upper warm water, and not in the cold deep waters.

Before an intake for Winnipeg water supply is finally laid out in Shoal Lake, observations during the entire summer season should be made by a competent person, in order to locate the best point of diversion.

Shoal Lake lies almost exactly 300 feet above the city of Winnipeg. It is a large, irregular body of water, of extreme dimensions 13 by 14 miles. The commission of 1907 proposed in their estimate (No. 9, p. 95) 22.6 miles of 64-inch pipe, 27 miles of 54-inch pipe, 43 miles of 48-inch pipe, with intake laid in about 20 feet of water, extending about 6 miles through Indian Bay to an intake crib in Shoal Lake.

The estimates submitted on page 95 of the report of 1907 give, for a daily capacity of 23,000,000 gallons:

1. Land and right of ways	$25,000
2. Intake	445,000
3. Pipe lines	2,839,000
4. Reservoir in Winnipeg	270,000
5. Pumping station in Winnipeg	370,000
6. Keeper's houses	20,000
7. Telephone lines	18,000
	3,987,000
Add 15 per cent	598,000
Total	4,585,000

I have given such study as time and the data at hand would permit to the effect of increasing the velocity of the water delivered to the city through the proposed pipe line, by introducing a pumping station at a point 22.6 miles west thereof. By this means it would be possible to increase the velocity of the water to 5 feet per second without introducing a total lift (divided between two points) of more than 50 feet, or less than the lift now required to lift the city supply from the present wells. This plan, I believe, would enable the pipe line to be reduced to 22.6 miles of 48-inch stave pipe and 70 miles of 42-inch pipe, saving about 20 per cent in the cost thereof and permitting the maximum delivery in excess of 30,000,000 gallons per day, instead of 23,000,000 by gravity delivery alone. The saving in cost of pipe line as per estimate of 1907 would be about $560,000. The cost of transmission line, transformers, pumps, and motors in duplicate would slightly exceed this sum. (See Appendix A.) The small amount of power required for pumping for a single pipe line would not warrant the construction of so expensive a transmission line. It is, therefore, proposed to operate the pumps by Diesel engines. Duplicate sets at two pumping stations would cost $180,000, and the cost of operation would be $50,000 per annum. (See Appendix A.)

More complete studies of the details of this plan of procedure, with comparative estimates on a variety of sizes of conduits and pumping units, may, and very likely will, lead to a better proportioned and more economical plan than the one here suggested. These studies must be postponed until the profile of the best route to Shoal Lake has been determined by detailed surveys, so that the exact amount of deep cutting, etc., that can be saved by such changes can be more accurately known. All costs and the price of fuel assured in Appendix A are purposely taken materially higher than current prices, so that they may be definitely relied upon.

COMPARISON OF UNIT PRICES, 1907–1912.

The profiles of the pipe line and river crossings, and a statement of the trenching, deep cutting, and wet excavation, upon which the estimates of the cost of the Winnipeg River and Shoal Lake projects were based by the commission of 1907, have not been found, and the material is, therefore, not at hand to permit of review or reestimate at current prices of the structures proposed in their report. Through the courtesy of the engineering staff of the Canadian Pacific Railway I am enabled to make the following comparison of unit prices: Labor, 10–20 per cent increase; lumber, 20 per cent increase; steel, unchanged; cement work, unchanged; cast-iron pipe, lower.

The cost of trenching, notwihstanding that labor cost is higher, is no more expensive in 1912 than in 1907, owing to the improvement in trenching machinery and the increased use of machines.

From these considerations it is obvious that an added 15 per cent to the total of the 1907 estimates of the cost of the Shoal Lake project would cover the cost of the same at present contract prices. This makes the present estimate of the cost of that project $5,183,000. I have not deducted the $560,000, the amount possible to be saved by the reduction in the size of the pipe, nor have I made the very considerable reduction that results from the elimination of the deep cutting. The estimates also include, it should be remembered, $270,000 to cover a reservoir, and $370,000 for a new pumping station in Winnipeg.

Just as this report is closed memoranda of Engineer J. E. Schwitzer have been found, including statements of a few unit prices. Among these is common labor, 2.25 cents per hour; carpenters, 32½–45 cents per hour; hauling, 50 cents per ton-mile. These show that the labor estimates of 1907 were not materially below present market.

COMPARISON OF THE WINNIPEG RIVER AND SHOAL LAKE PROJECTS.

The 1907 commission estimated the cost of a single pipe line to the Winnipeg River of 23,000,000 gallons per day capacity to be $3,862,000. The introduction of electric power since that date and the changes in size of conduits, etc., that in consequence may be made would certainly permit the construction of a single pipe line to the Winnipeg River of a capacity of 30,000,000 gallons per day for a sum less than that estimated in 1907. The water from the Winnipeg River must be treated and filtered for color and suspended matter and carefully watched from the sanitary standpoint. The present population of Kenora does not threaten serious contamination. The development of water power in the Winnipeg River above the proposed intake is likely to introduce an increased industrial population, and consequently the sanitary quality of the river water may gradually become somewhat worse. If I am correctly informed of the amount of spruce and other pulp wood available near these water powers, the paper industry, among others, is one that is likely to develop. The waste from paper mills, even after treatment, introduces serious complications, to say the least, and the

growing industrial population would require constant vigilance to maintain perfect the sanitary quality of the water supply.

The water of Shoal Lake would require no treatment. No fear need ever be in mind that the sanitary quality of the water would be poor at any time in the future. The shores of the lake are hard rocks of the Laurentian series, entirely unfitted for agriculture, and the country thereabout must remain in its present wild state indefinitely. There need be no fear of the growth of cities or towns upon the shores of Shoal Lake. The Lake of the Woods constitutes an enormous reservoir of clear, pure, and soft water, situated 300 feet above the city of Winnipeg, and within 100 miles of the city.

As previously stated, the water of Shoal Lake would never require sanitary treatment. I believe that an intake could be so located that there would be no trouble from algae. The algae are harmless from the health standpoint, but they impart a sea-weed odor and taste to water, and accordingly should be removed when present. They may grow in any artificial or natural reservoir open to sunlight.

If, for any reason, it should be determined that an intake entirely free from algae is impracticable, their removal can be effected by straining or simple mechanical filtration at the station 22.6 miles from Shoal Lake. This plan, if necessary, need be operated during a portion of the summer months only.

It is an objection to the Winnipeg River project of some importance that the water must be carefully watched from the sanitary standpoint and filtered to secure proper purification. It is, of course, possible by proper care, to purify the Winnipeg River water even though the industrial population at Kenora and elsewhere on the river should grow, and the present minute contamination should materially increase. If the city can command the services of suitable experts and enforce such military discipline among its employees that filtration and similar works can be operated with practically no lapse in efficiency, then it need never fear a polluted supply. In America it has been found to be very generally the case that the cities are unable to maintain that discipline and expert supervision that is absolutely essential to the operation of sanitary water-treating plants. Water-supply engineers of high standing quite generally refrain from recommending such plants where a safe supply is available from other sources. "It should be fully understood and appreciated that any supply that demands filtration as an adjunct must depend for its purity on constant care and vigilance by experts thoroughly conversant with such operations, and that any carelessness or lack of vigilance will result in a temporary reduction in quality, which may, if it occurs at a critical time, result in contamination, with possible resulting sickness and death among its users." (Report on Rockford supply, 1911.) The best results with any public work are always secured by concentrated rather than continuous effort. A water supply which is naturally pure and which must simply be guarded by proper construction in order to insure its constant delivery to the consumer in potable condition is much to be desired above any supply that demands continuous vigilance as the price of safety.

The construction of the conduit line to Shoal Lake presents no unusual engineering difficulties. The lake can be reached, it seems, without rock cutting. It appears certain that Snake Lake and Falcon River can be drained into Boggy River by a cut of about ten feet, and thus avoid about ten miles of wet excavation at the eastern terminal of the conduit. While the Shoal Lake line constitutes a major project, it is free from serious engineering difficulties. The project would be considered attractive by a large range of competent contractors.

REPORT ON A WATER SUPPLY FROM SHOAL LAKE FOR GREATER WINNIPEG WATER DISTRICT.

NEW YORK, *August 20, 1913.*

To His Worship the Mayor and the City Council, Winnipeg, Manitoba.

GENTLEMEN: The board of consulting engineers received from you on May 20, 1913, the following instructions:

"That the board of consulting engineers be instructed to submit report on the best means of supplying the Greater Winnipeg Water District with water from Shoal Lake, together with estimate of cost and general plan of the work."

and respectfully presents herewith its report in accordance with such instructions.

Briefly summarized, our conclusions and recommendations are as follows:

1. Shoal Lake, without help from the main Lake of the Woods, can be depended upon to furnish, even in the driest years, a large part, if not all, of the water needed for Winnipeg until the population shall have reached about 850,000, and with the help of the Lake of the Woods can furnish a practically inexhaustible supply.

2. The water of Shoal Lake was, when we examined it, of excellent quality for domestic and manufacturing purposes, being soft, practically free from contamination, without noticeable color, free from odors, and of an agreeable taste. The results of recent examinations of the Shoal Lake water, and all of the local conditions, indicate that the occurrence of bad tastes and odors in the water, from growths therein, should be infrequent, and may never occur at all.

Should such troubles occur in the future the opportunity to correct them by suitable treatment may be availed of when necessary without interrupting the supply of water to the city or making expensive changes in the works as built.

3. The best point to take the water is from near the west end of Indian Bay, an arm of Shoal Lake, as the depth of the water and the configurations of the bottom and shores in this neighborhood are favorable.

4. In order to avoid the dark-colored water discharged by Falcon River, and cut off the shallow flowage at the extreme westerly end of Indian Bay, we propose the construction of a dike across the end of the bay and a canal leading therefrom to Snowshoe Bay, through which to divert the undesirable waters.

5. We find that the best way to get Shoal Lake water to Winnipeg is to bring it down first through a concrete aqueduct 84.75 miles in length, laid with a continuous down grade to a point about a mile east of Transcona, and then in a 5-foot steel pipe to the Red River. A 5-foot cast-iron pipe, in tunnel, is to convey the water under the river, and thence a 4-foot cast-iron pipe, laid in the city streets, will deliver it to the reservoirs at McPhillips Street. The total length of the aqueduct is 95.35 miles.

6. We recommend that the concrete portion of the aqueduct be given a capacity of 85,000,000 imperial gallons per day, but that the pipe line portion be given the smaller sizes above stated, capable of discharging 25,000,000 gallons per day by gravity into the McPhillips Street reservoirs.

7. We recommend taking the water out of Shoal Lake by gravity rather than pumping it over the summit in pipe lines.

8. We estimate that the total cost to the Greater Winnipeg Water District of building the intake, Falcon River diversion works, concrete aqueduct and steel and cast-iron pipe lines, including crossings of streams and rivers, waste weirs, and other appurtenant works, will be $13,045,600.

This estimate does not include the cost of acquiring land, or of branch pipes to the different communities; neither does it include any allowance for water damages, and for interest charges.

9. We recommend as a part of the plan, but not for immediate construction, that a new storage reservoir, holding about 250,000,000 gallons, and estimated to cost between $300,000 and $400,000, be built at a point about a mile east of Transcona, and that a main pumping station be there established to force the water to the city through the 5-foot steel pipe, and through branches to be laid to the different sections of the city and district requiring the water. This reservoir and pumping station should be completed and ready for use before the demands for water shall have reached the capacity of the pipe line.

The general alignment and profile of the proposed aqueduct line are shown on sheets 1 and 2 of the plans.

The board convened at Winnipeg on May 10, and on that day received verbal instructions and made a general inspection of Winnipeg and a part of the surrounding territory. May 12, 13, and 14 were devoted to visiting Shoal Lake under your guidance, at which time we had an opportunity to observe the character of the water in the lake, to investigate the various features of Snowshoe and Indian Bays (arms of the lake), and the territory near them, to take a trip into Falcon River and Snake Lake and to examine the work in progress at the laboratory at the Indian school on the shore of Shoal Lake.

We remained in Winnipeg until May 24, examining the plans and reports which had been prepared by your city engineer, inspecting in detail the location of the proposed aqueduct and pipe lines in Winnipeg and as far easterly as the line was accessible, including the crossings of the Red and Seine Rivers, and in obtaining information from those engaged in operations in this section of the country as to the conditions to be encountered and the cost of performing the work. We also made approximate estimates of the cost of various methods of conveying water from Shoal Lake to Winnipeg, and reached the tentative conclusion that for the greater part of the distance a concrete aqueduct laid on a continuous down grade from Shoal Lake, so that it would not be under pressure, would be the most desirable form of construction.

This conclusion necessitated some additional surveys, because the original surveys were based upon the use of a pipe under pressure, which consequently did not have a continuous down grade from the lake. The results of these surveys have been sent to us from time to time, the last information being received August 18.

* * * * * * *

QUALITY OF WATER OF SHOAL LAKE.

Physical and chemical examinations of water taken from Shoal Lake show that it is practically free from contamination, that it is clear and practically without color and that it is free from odor and has an agreeable taste. It is very soft in comparison with the water at present supplied to Winnipeg, and was, at the time we examined the water, of excellent quality for a domestic water supply. The chemical analyses show that it is well suited for boiler and general manufacturing purposes.

Microscopic examinations of the water have been made every day or two since June 2, and the results up to August 2 were available to us at the time of writing this report. They show, as is the case with the water of all lakes and reservoirs, that the water contains a variety of minute animal and vegetable organisms which can be discerned with the microscope and some of them with the naked eye. The total number of organisms per cubic centimeter has ranged from 249 to 1,776, and averaged 833, which is no more than the amount usually found in small lakes and the better class of reservoirs used for water supplies.

So far as the examinations have been carried, the water has had no disagreeable taste or odor at any time, but it is sometimes the case that these minute organisms increase greatly in numbers and give the water a pondy or even a disagreeable taste. This is not as likely to be the case in large lakes as in small ponds and artificial reservoirs. Many cities take water from the Great Lakes, from Lake Superior to Lake Ontario, and there has been no complaint from bad taste or odors from such waters, although they are not free from microscopic organisms.

There are many other reservoir supplies which contain a much larger number of organisms than has been shown by the recent examinations of Shoal Lake water, and which are nevertheless used without serious complaint on the part of the water takers.

We can not in the absence of definite knowledge as to the history of Shoal Lake water affirm that growths will not occur to cause at times unpleasant tastes and odors, but the results of recent observations and all of the conditions indicate that troubles from bad tastes and odors should be infrequent and not very serious, if they occur at all.

Having made such an extended reference to these organisms, we wish to state positively that they have no relation whatever to disease germs and there is no evidence that they render the water unwholesome.

Should it ever become desirable to filter the water, either completely or to the more limited extent required to remove the microscopic and larger organisms, this can be provided for at the site of the proposed reservoir east of Transcona, where an opportunity is also presented for the aeration of the water should this be found advantageous.

The situation of Shoal Lake is such that there are two bays forming a part of the lake which are from 4 to 5 miles nearer Winnipeg than the main lake, and water could be taken from these bays with a saving in the cost of works much greater than the proportionate saving in the length of the aqueduct.

Snowshoe Bay, the southerly of the two, is so shallow that waves, due to winds, stir up the mud on the bottom and the water would be turbid and unsatisfactory for use. Indian Bay has sufficient depth—generally a little more than 20 feet—so that the effect of the waves, if any, upon the bottom would be slight; but Falcon River brings into the west end a considerable quantity of dark-colored muskeg water, which gives the water at the end of the bay a marked brownish tint. (See sheet 4, Appendix.)

Our investigations, however, show that toward the west end of these bays the distance between them is only two-thirds of a mile, and that the ground is but little above the level of the water in the bays, so that it is feasible, at small cost, to cut a channel from one bay to the other, and this channel, in connection with an embankment across the westerly end of Indian Bay, would divert the Falcon River from Indian Bay into Snowshoe Bay, thus making Indian Bay an acceptable location for the intake of the aqueduct.

It may be questioned by some whether the water of Falcon River will not ultimately find its way through Snowshoe Bay into Indian Bay and thus affect the quality of the water supply. It is true that the water of the river will in time find its way from Snowshoe Bay into Indian Bay, but these bodies of water are so large that it will require several years for the water to complete the course and in the meantime the color of the Falcon River water will have disappeared through the bleaching agencies that nature provides. It is probable that a large proportion of the water which enters Shoal Lake from its drainage area is a brownish muskeg water, but as the supply in each year is only a small part of the capacity of the lake, it undergoes the transformation which makes it a nearly colorless and attractive looking water.

DESCRIPTION OF PROPOSED WORKS.

The main features of the work for immediate construction are:

1. A dyke and channel for the diversion of the Falcon River into Snowshoe Bay.

2. A concrete masonry aqueduct, having a continuous down grade for 84.73 miles from an intake at Indian Bay to a point just south of the Grand Trunk Pacific Railroad, about 1 mile east of Transcona, the aqueduct having a capacity of 85,000,000 gallons of water daily.

3. A pipe 5 feet in diameter, extending from the end of the masonry of the concrete aqueduct, most of the way through streets, to Victoria Park on the west side of the Red River in Winnipeg; this pipe to be of steel except under the Red River, where cast-iron pipe laid in a tunnel is recommended.

4. A 48-inch cast-iron pipe through the streets of Winnipeg from Victoria Park to the McPhillips Street reservoirs. The pipe line will, as stated, have a capacity of 25,000,000 gallons daily.

Falcon River diversion.—The works for diverting the Falcon River are shown on sheet 4 of the accompanying plans. They consist of a curved dyke a mile long, separating the shallow westerly portion of Indian Bay, into which the Falcon River enters, from the remainder of the bay, and of a ditch 3,300 feet long (35 feet wide and 7 feet deep), to furnish a free passage for the water of the Falcon River and the westerly portion of the bay into Snowshoe Bay.

The dike (sheet 5) is to be a substantial embankment of sandy and gravelly material, raised 4 feet above the high-water level of the lake and protected on the exposed side with a heavy facing or riprap.

Intake.—The intake of the aqueduct is to be located at the northwesterly corner of the bay, where the conditions are very favorable, in that the shore for a long distance is rocky and the depth of water 50 feet from the shore is 10 feet and 170 feet from the shore 15 feet. (See sheet 4, Appendix.)

(The following communications were offered in evidence by Mr. Campbell:)

TORONTO, ONTARIO, *February 26, 1913.*

TOWN CLERK: City of Winnipeg here pressing Government to take water from Shoal Lake. If you have representation to make in opposition wire minister of lands for appointment and send delegation to oppose. Urgent.

MACHIN.

KEEWATIN, ONTARIO, *February 27, 1913.*

Capt. H. A. C. MACHIN, M. P.,
House of Assembly, Toronto, Ontario:

Council no representation to make against Winnipeg water supply.

W. J. CRAIG, *Clerk.*

I, William J. Craig, clerk of the town of Keewatin, hereby certify that the above are true copies of the message received and the reply thereto.

[SEAL.] W. J. CRAIG, *Town Clerk.*

KEEWATIN, ONTARIO, *January 6, 1914.*

WINNIPEG, MANITOBA, *January 14, 1914.*

ISAAC CAMPBELL, K. C.,
Shoreham Hotel, Washington, D. C.:

The Winnipeg Electric Railway Co. has no objection to the city of Winnipeg taking its water supply from Shoal Lake.

F. MORTON MORSE, *Secretary.*

WINNIPEG, MANITOBA, *January 14, 1914.*

ISAAC CAMPBELL, K. C.,
Shoreham Hotel, Washington, D. C.:

Consultation with Deacon Reynolds and Chase unanimously agree to accept order taking risk of effect of possible regulation of lake levels.

H. A. ROBSON.

GOV. EBERHART'S TELEGRAM TO MANITOBA PUBLIC UTILITIES COMMISSIONER ROBSON.

Referring to your inquiry relative to the action of the International Joint Commission in Canada with the Greater Winnipeg Water District, the State of Minnesota is anxious to work in cooperation with the people of Canada and especially with those of Manitoba, who are our closest neighbors. While I would have no authority to speak for the State, I feel confident that there would be no objection so long as the interests of the State were guarded to the granting by the International Joint Commission on Boundary Waters of the application by the Greater Winnipeg Water District for permission to divert water from the Lake of the Woods as suggested. I make this statement through my knowledge of the friendly feeling the people of the State of Minnesota have for the people of Winnipeg and of Canada in general. I make it without investigation of the case in point, and, of course, it is based on the assumption that it would be a mutually satisfactory arrangement that the interests of Minnesota would be guarded as carefully as those of Canada. This feature is for the International Joint Commission to determine.

LAKE OF THE WOODS MILLING CO.,
Winnipeg, Canada, January 7, 1914.

DEAR MR. DEACON: Re Shoal Lake water supply.

Adverting to our conversation to day re the above.

I beg to confirm the statement I made that the Lake of the Woods Milling Co. would not object to the city of Winnipeg diverting all water it required from Shoal Lake, being satisfied that the supply required for a city of over 1,000,000 inhabitants would not impair the power owned by this company to any appreciable extent.

I might also add that this company are the largest power users in the Lake of the Woods district.

If this water supply scheme is adopted by the city of Winnipeg, I would be in favor of both Dominion and local Governments setting apart for a forest and game reserve all the territory within 5 miles of Shoal Lake, to prevent future contamination of the waters. This could easily be accomplished at the present time, as there are very few settlers in the district.

Yours, very truly,

LAKE OF THE WOODS MILLING CO.,
W. A. MATHESON, *General Manager.*

His Worship Mr. T. R. DEACON,
Mayor City of Winnipeg.

KEEWATIN, ONTARIO, *February 27, 1913.*

Hon. W. H. HEARST,
Minister of Lands, Toronto, Ontario:

No opposition to make to taking water from Shoal Lake for city of Winnipeg.

BOARD OF TRADE,
A. J. HOLMES, *President.*

(Documents referred to but not printed are on file in the offices of the commission.

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